FID/R174

FAO Fisheries Reports, No. 174 FID/R174 (En)

LIBRARY
APR 21 1976
FISH & WILDLIFE SERVICE

Report of the third joint meeting of the

INDO-PACIFIC FISHERIES COUNCIL

Special Committee on Management of Indo-Pacific Tuna

Third Session

and the

INDIAN OCEAN FISHERY COMMISSION

Committee on Management of Indian Ocean Tuna

Fourth Session

Mombasa, Kenya, 18-19 July 1975

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Report of the Third Joint Meeting of the

INDO-PACIFIC FISHERIES COUNCIL

Special Committee on Management of Indo-Pacific Tuna

Third Session

and the

INDIAN OCEAN FISHERY COMMISSION

Committee on Management of Indian Ocean Tuna

Fourth Session

Mombasa, Kenya, 18-19 July 1975

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1975

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The copyright in this book is vested in the Food and Agriculture Organization of the United Nations. The book may not be reproduced, in whole or in part, by any method or process, without written permission from the copyright holder. Applications for such permission, with a statement of the purpose and extent of the reproduction desired, should be addressed to the Director, Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.

© FAO 1975

PREPARATION OF THIS REPORT

This is the final version of the report, as approved by the Joint Meeting of the Indo-Pacific Fisheries Council Special Committee on Management of Indo-Pacific Tuna, Third Session, and the Indian Ocean Fishery Commission Committee on Management of Indian Ocean Tuna, Fourth Session, and adopted by the Fourth Session of the Indian Ocean Fishery Commission, held in Mombasa in July 1975. It includes the report of the Special Southern Bluefin Tuna Working Party, held in Shimizu, Japan, in June 1975, and other material submitted to the joint meeting.

Distribution:

Participants in the meeting
Members of the Indian Ocean Fishery Commission
Members of the Indo-Pacific Fisheries Council
Other interested nations and international organizations
FAO Department of Fisheries
Fishery Officers in FAO Regional Offices
Selector SM

Bibliographic Entry:

Indo-Pacific Fisheries Council, Special Committee on Management of Indo-Pacific Tuna, Third Session, and the Indian Ocean Fishery Commission, Committee on Management of Indian Ocean Tuna, Fourth Session, Mombasa, Kenya, 18-19 July 1975 (1975)
FAO Fish.Rep., (174):47 p.
Report of the Third Joint Meeting of the .....

Conferences. Reports. Tuna fisheries. Stock assessment. Fishery statistics. Fishery management. Migrations. Tagging. Indian Ocean. Pacific Ocean.

CONTENTS

	Paragraphs
OPENING OF THE MEETING	1 - 2
ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE MEETING	3
REVIEW OF THE CURRENT KNOWLEDGE OF THE STATE OF THE STOCKS OF TUNA IN THE INDIAN OCEAN AND WESTERN PACIFIC	4 - 14
REQUIREMENTS FOR STATISTICAL AND OTHER DATA, AND STEPS REQUIRED TO FULFIL THEM	15 - 20
POSSIBLE MANAGEMENT MEASURES	21 - 34
The essential elements leading to management advice	26 - 29
Mechanism for management decisions	30
Suggested course of action	31 - 32
Recommendations	33 - 34
DATE AND PLACE OF THE NEXT MEETING	35

		Page
Appendix A	List of delegates and observers	7
B	Agenda	10
C	List of documents	11
D	Summary of statistics of landings (catches) of tuna from the Indian Ocean	12
E	1974-75 tuna season in Australia	23
F	Report of the Special Southern Bluefin Tuna Working Party	29

Digitized by the Internet Archive
in 2025

https://archive.org/details/fao-fisheries-and-aquaculture-report_1975-07_174

OPENING OF THE MEETING

1 The Indo-Pacific Fisheries Council Special Committee on Management of Indo-Pacific Tuna, and the Indian Ocean Fishery Commission Committee on Management of Indian Ocean Tuna held their Third Joint Meeting on 18-19 July 1975 at Mombasa, Kenya, as advocated at their Second Joint Meeting, October 1972. The meeting was attended by representatives of nine of the 13 member nations of the Committees and by observers from Kenya, Mauritius, the Inter-American Tropical Tuna Commission and the International Commission for the Conservation of Atlantic Tunas. A list of delegates and observers is given in Appendix A to this report.

2 Mr. E.A. Purnell-Webb (Australia) was elected Chairman of the meeting, the previous Chairman, Mr. J.J. Kambona, having joined the staff of FAO.

ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE MEETING

3 The agenda as adopted by the Joint Meeting is given in Appendix B to this report. The documents which were before the Committees are listed in Appendix C.

REVIEW OF THE CURRENT KNOWLEDGE OF THE STATE OF THE STOCKS OF TUNA IN THE INDIAN OCEAN AND WESTERN PACIFIC

4 The Committees reviewed the information on the current state of the stocks, contained in the Report of the Second Session of the IPFC/IOFC Ad hoc Working Party of Scientists on Stock Assessment of Tuna (IOFC-IPFC:TM/75/4), the additional information based on statistical data collected by Dr. R. Kearney, FAO consultant (IOFC-IPFC:TM/75/4, Sup.1), analyses of the data of the albacore fishery based on American Samoa (IOFC-IPFC:TM/75/Inf.5 and Inf.7), information on the Australian 1974-75 season (IOFC-IPFC:TM/75/Inf.11) and the report of the Special Southern Bluefin Working Party (IOFC-IPFC:TM/75/Inf.10).

5 For the longline fishery in the Indian Ocean the more recent analyses confirm the conclusions of earlier meetings that the stocks of yellowfin, albacore and bigeye exploited by the longliners are heavily fished. Increases in the amount of fishing will certainly not add to the total catch to any large extent, and will reduce the catch per unit effort. During the second half of 1974 and the beginning of 1975 there was a big drop in the catch effort and catch per unit effort of Korean and Taiwanese vessels based in Mauritius and Malaysia (but not to such a marked extent for Japanese vessels). The 1975 catch of these species may, if the low catch rates extend into the second half of the year, only amount to a small fraction of that in 1973. The drop in effort (and hence to some extent also in catch) is due to economic factors, particularly the rise in fuel costs and the drop in prices; however, the drop in landings per vessel in Mauritius and Malaysia, which seems to have been most marked for yellowfin, may represent a change in availability or a real decrease in stock abundance. The latter would imply that these stocks have been more seriously affected by the long period of heavy fishing, up to and including 1974, than the previous analyses suggest. More detailed examination of the data, taking account of the size of fish caught, and the distribution of fishing in space and time, is required to determine the exact causes of the decrease of catch per unit effort in 1975, as well as the differences between Japanese and other fleets.

6 The influence of the surface fisheries on yellowfin has not been accurately assessed but, since the estimated numbers caught in the surface fisheries are approximately equal to the recruitment to the longline fishery, the influence could be considerable. Better data on the weight, number and size in the surface fishery are urgently needed.

7 In the Pacific the detailed data from the landings at American Samoa, together with the statistics of total catch, show that the albacore stock available to the longline fishery is fully exploited, with a maximum sustainable yield under average conditions of 33-35 000 tons. Increased fishing cannot be expected significantly to add to the catch and may instead decrease it. This conclusion is not sensitive to the likely range of errors in the data presented.

8 While analyses of the yellowfin and bigeye in the Western Pacific were not presented, it would be surprising if these stocks, like stocks of tuna available to the longline fisheries in other parts of the world, were not at least moderately heavily fished. Detailed analyses of the stocks are, however, urgently needed and the Committees recommended that the countries concerned should collaborate in making such a study.

9 No definitive assessment of the state of the skipjack stocks had been made. It was noted that catches of this species in the southwestern Pacific have increased rapidly and are now at a very high level. Delineation of unit stocks of skipjack is urgently needed so that the state of the stocks can be examined.

10 The stocks of southern bluefin tuna had been the subject of particular study, including the review by the Special Working Party. Cohort analysis had been used to revise estimates of the fishing mortality, the best estimates being 0.15 in the surface fishery (possibly higher in the most recent years) and 0.4 to 1.0 among the older ages (7 to 12 years) caught in the longline fishery. These estimates are still preliminary and therefore had not yet been incorporated in a yield-per-recruit assessment, though they were consistent with earlier assessments that increased longline fishing would not increase the total yield.

11 The evaluation of the effect of the surface fishery for southern bluefin by Australian vessels was made uncertain by a number of factors: first, it is not clear what proportion of the total stock of young bluefin are found near to Australia, since some 3-year and even 2-year-old fish occur off South Africa. Also there have been big changes in the Australian fishery. The 1974-75 season was abnormal with relatively large, old fish dominating the catch by weight. This was particularly the case for the catch by purse-seines which took large catches for the first time, and for which the size composition of the catch, taken well off-shore, was similar to that of the longliners working on the same grounds.

12 For all the longline data the question was raised of the reliability of the catch-per-hook data as a measure of stock abundance. Changes have occurred in the type of bait, and the number of hooks per basket, while at least for the southern bluefin there may be physical competition between vessels for the most suitable fishing grounds. These may affect the precise position of the current fishery on the curve relating catch to total fishing effort but, in view of what appears to be the flat-typed nature of this curve (i.e. the catch is relatively constant over quite a wide range of fishing effort), these problems will not significantly affect the conclusion that this population is yielding close to its maximum.

13 It was noted that, while the longline effort in the Indian Ocean was, in the middle of 1975, relatively low, this was due to economic factors, resulting in diversion to other areas, and to the laying up of many vessels. These might be temporary effects and, when economic conditions improved (better prices, less cost or improved catch rates), it was likely there would be a rebuilding of effort in the region.

14 The Committees also discussed some of the scientific problems involved in better assessment of tuna stocks. They noted with pleasure the progress being made in the aging of tuna through the counting of daily marks and urged that member countries collaborate in these studies, e.g. by continuing the interchange of otoliths. They also noted the progress made toward the better understanding of the distribution of skipjack through metabolism and temperature requirements of the skipjack of different sizes.

REQUIREMENTS FOR STATISTICAL AND OTHER DATA, AND STEPS REQUIRED TO FULFIL THEM

15 Good, reliable, detailed and up-to-date statistics are essential for stock assessment work, and hence for advice on management. The report of the Nantes meeting and other documents have stressed that the currently available statistics for the Indian Ocean are in many respects inadequate (see especially Table 1 of IOFC-IPFC:TM/75/5).

16 The prime responsibility for improving statistics lies with national governments. The Committees therefore urged all governments with significant tuna fisheries to give high priority to the collection and reporting of the necessary statistical data; however, in addition to the national responsibilities much work needs to be done by regional or other international bodies. In addition to the direct assistance to governments in their national programmes for data collection which might be given by FAO and its field programmes, particularly the Indian Ocean Programme or the South China Sea Programme, this work includes:

(a) Establishment of guidelines or other instructions for the requirements for data collection and reporting

(b) Compilation and publication of data reported by member governments

(c) Active pursuit of data in cases where national reports are inadequate for one reason or another, e.g. of catches landed at foreign ports

17 This work is time-consuming, and cannot be done properly without adequate staff. The Committees noted with appreciation the progress achieved, especially through visits to several of the major tuna ports in the Indian Ocean by the FAO consultant, Dr. R. Kearney, though it was stressed that this progress would be short-lived unless the port visits and other activities were repeated at regular intervals. Experience of other regional bodies, particularly the International Commission for the Conservation of Atlantic Tunas (ICCAT) suggested that, in the first instance, a full-time staff of two or three professionals (with adequate travel funds), would be necessary. The work involved in raising the basic statistics to the required standard should decrease as national statistics improve, but this would likely be balanced by the need for more detailed data as specific management measures came under consideration with no overall reduction in work-load.

18 Although the money required to do this work would probably be of the order of US$100 000 annually, it was stressed that this was far exceeded by the cost of failing to manage; and this failure was probably inevitable if adequate statistics and other data were not provided. The Committees therefore stressed that money spent for this would be money well spent. Because of the close link between statistics and management, the possible arrangements under which this money might be provided was discussed under the following item of the agenda.

19 The Committees noted the statistical activities of the two existing tuna commissions (I-ATTC 1/ and ICCAT). They welcomed the offers of collaboration made by the observers from these organizations, which was likely to be extremely helpful in view of the similarity of the problems met in obtaining good tuna statistics in each ocean, and the fact that to a large extent the same countries and often the same vessels were involved. They therefore urged that IOFC and IPFC should continue and strengthen this collaboration.

20 They also suggested that the ICCAT Field Manual, adopted and modified where appropriate and where necessary, could be used as a guideline in the compilation of tuna statistics in the Indian Ocean by statistical offices. This manual included notes on the collection of biological data, as well as data on bill fishes, and the same should be done for the Indian Ocean.

POSSIBLE MANAGEMENT MEASURES

21 The analyses of the state of the stocks showed that management measures were becoming increasingly urgent. Certain measures had already been adopted by Japan in respect of its longline fishery on southern bluefin, and unilateral measures have also been introduced, and others were being considered, by Australia for their bluefin fisheries. The effect of the Japanese measures had so far not been measurable, and it was likely that the effect of both sets of actions was more in terms of preventing further deterioration of the situation than of actual improvement.

1/ I-ATTC = Inter-American Tropical Tuna Commission

22 The Committees stressed that properly chosen management measures were of vital interest to all countries currently or potentially engaged in tuna fishing in the Indian Ocean and Western Pacific, and not just to the few countries, largely from outside the Indian Ocean, mainly engaged in the present fisheries. In fact several developing countries already had important fisheries.

23 The report of the Second Session of the IPFC/IOFC Ad hoc Working Party of Scientists on Stock Assessment of Tuna (IOFC-IPFC:TM/75/4) and the report of the Special Southern Bluefin Tuna Working Party (IOFC-IPFC:TM/75/Inf.10) has pointed up the need for management considerations, especially for albacore, yellowfin and southern bluefin tuna.

24 Complete data on which to base precise statements on the state of specific fisheries are not available,and probably never will be so, but those data which are available demonstrate quite clearly that some of the stocks are being heavily exploited and that increasing the effort will not only cause the catch per unit of effort to fall further but may also cause a decline in the annual total catch. Such a situation would be harmful both to those countries presently engaged in tuna fishing and those planning to enter the fishery.

25 The development and introduction of management measures will require the expenditure of money but, as has been pointed out in the paper on the inadequacy of statistics (IOFC-IPFC:TM/75/5), the cost of failing to manage heavily fished resources can run to 10 percent or more of the total value.

The essential elements leading to management advice

26 Statistical compilation: The paper on the inadequacy of statistics (IOFC-IPFC:TM/75/5) states: "The reports of the various sessions of the Ad Hoc Working Party have pointed out that the inadequacies of the statistical data make it difficult, if not impossible, to make more precise assessments of the state of the stocks or reliable estimates of the effect of different management measures." This has made it more difficult to agree on international management measures for the heavily fished stocks of larger tuna or to give quantitative advice on the development of lightly exploited stocks. There is a need for a person or group of persons to have responsibility to identify the statistics required, set out the form in which those statistics should be presented, encourage, and perhaps even be actively engaged in, the collection of the required statistics and compile these for the scientists and those responsible for management.

27 Scientific review. The Ad Hoc Working Party of Scientists on Stock Assessment has provided information on the state of tuna stocks where data have been available and analysis undertaken, and it has also encouraged more detailed analysis by sub-groups, e.g. meeting of Japanese and Australian scientists at Shimizu (IOFC-IPFC:TM/75/Inf.10). Whilst the results of these deliberations have been exceedingly valuable, management considerations require continuing review of the data. It is, therefore essential that the working party of scientists be upgraded to a standing committee with the basic function of providing review statements on the state of the tuna stocks as required.

28 Management advice. The structure of the IPFC and IOFC joint meeting of tuna management committees is not appropriate for detailed discussions on management alternatives and implications. There is a need for a smaller standing group to undertake this task, following advice from the group of scientists on the state of the stocks under consideration.

29 Executive Secretariat. Based on the experience of other fisheries management agencies, e.g. ICCAT, the effective collection and compilation of statistics and the effective servicing of the groups of scientists and management advisers can probably best be achieved by the appointment of an appropriate person (or persons) to undertake the specific functions of the secretariat to the tuna management complex. Such an appointment would provide the focal point for the inputs leading to management advice, and the dissemination of country views to appropriate groups.

Mechanism for management decisions

30 At the Second Joint Meeting of the IPFC and IOFC Tuna Management Committees (IOFC-IPFC:TM/75/Inf.3) two main points of view were presented in relation to the structure of the decision-making body. One view was that a new body should be created similar to I-ATTC or to ICCAT. The other view was that IOFC and IPFC were well-equipped to undertake the role of management. These two views have again been expressed; however, in practical terms, even if a convention philosophy was agreed upon, it would probably be necessary to commence with a management regime within the framework of IPFC and IOFC, with management acceptance by nations being achieved in a manner similar to that operating for the Fishery Committee for the Eastern Central Atlantic (CECAF) because of the time required for the drawing up and adopting of a convention.

Suggested course of action

31 Whichever structure for management decision is finally adopted, i.e. by a convention or by the IPFC/IOFC Tuna Management Committees, there is a need to have prepared precise statements on the functions and method of operation of the proposed secretariat, and standing committees on statistics, scientific review, and management advice. Furthermore, there is a need for the preparation of detailed proposals for financing, both in the short term and long term, the structure finally adopted.

32 In terms of timing, it is highly desirable that the preparation of these statements be undertaken within the next 12 months and that implementation commence prior to the next meeting of the IPFC/IOFC Tuna Management Meeting. To facilitate such a programme, the Bureau 2/ of IOFC could be empowered to adopt proposals and initiate follow-up action.

Recommendations

33 This joint meeting of the IPFC and IOFC Committees on Tuna Management recommends to IOFC and to IPFC:

(i) That a small ad hoc committee of nations be established (a) to prepare statements on the functions and methods of operation of a joint secretariat and standing committee or committees on statistics and scientific review, and on management advice, (b) to prepare a statement on the method of financing, both in the short term and long term, the management structure

(ii) That the Bureau of IOFC be empowered to consider and act upon proposals in these specific fields and to initiate follow-up action

(iii) That the matter be placed on the agenda of the next session of the IPFC Executive Committee

(iv) That FAO seek funds for carrying out urgent work in this connexion, pending the completion of the arrangements mentioned above

34 It was noted that the Committees' terms of reference included only tunas (which should be taken to include billfish, and smaller species of tuna, such as Euthynnus), but that IOFC and/or IPFC might ultimately find it convenient to include consideration of the problems of management of fisheries on other species.

2/ Bureau in this context refers to the officers defined in Rule II-1 of the IOFC Rules of Procedure:

"The Commission shall elect, at the end of every Session, a Chairman and a maximum of six Vice-Chairmen who shall remain in office until the election of the new Chairman and new Vice-Chairmen. The out-going Chairman and Vice-Chairmen shall be eligible for re-election."

DATE AND PLACE OF THE NEXT MEETING

35 The Committees agreed that their next meeting should be held at the same time and place as a meeting of IOFC or of IPFC. The precise date should be decided by the Secretariat in consultation with the Chairman, taking into account in particular the progress achieved by the committee recommended to study the statistical, scientific and management arrangements.

* * * * * *

Appendix A

LIST OF DELEGATES AND OBSERVERS

x+ Australia

PURNELL-WEBB, E.A.
Assistant Secretary
Operations Branch
Fisheries Division
Department of Agriculture
Canberra A.C.T. 2604

BOWEN, B.K.
Director
Department of Fisheries and Wildlife
108 Adelaide Terrace
Perth, Western Australia

MURPHY, Dr. G.I.
Senior Principal Research Scientist
CSIRO
P.O. Box 21
Cronulla, New South Wales 2230

x France

GARACHE, S.
Adjoint au Chef
Bureau des conventions internationales
Direction des pêches maritimes
Secrétariat général de la marine marchande
Ministère des transports
3, Place de Fontenoy
75007 Paris

MARCILLE, J.
Chargé de recherche
Office de la recherche scientifique et technique Outre-Mer (ORSTOM)
24, rue Bayard
75008 Paris

x India

GEORGE, Prof. P.C.
Joint Commissioner (Fisheries)
Department of Agriculture
Ministry of Agriculture and Irrigation
Krishi Bhavan
New Delhi

x+ Indonesia

x+ Japan

MIMURA, K.
Associate Director for Research Management
Research and Development Department
Fisheries Agency
Ministry of Agriculture and Forestry
2-1 Kasumigaseki
Chiyoda-ku, Tokyo

SHIMURA, S.
Director of the Guidance Division
Federation of Japan Tuna Fishery Co-operative Associations
2-3-22 Kudankita
Chiyoda-ku, Tokyo

x+ Korea (Republic of)

KIM HOE CHEON
Fisheries Attaché
Embassy of the Republic of Korea
Abidjan, Ivory Coast

+ New Zealand

+ Philippines

x Sri Lanka

PANDITHA, V.
Senior Assistant Secretary
Ministry of Fisheries
P.O. Box 1707
Galle Face
Colombo

x Tanzania

---

x IOFC Committee
+ IPFC Committee

+ Thailand

BOONPRAKOB, U.
Senior Fisheries Technical Officer
Division of Fisheries Investigation
Department of Fisheries
Ministry of Agriculture and Cooperatives
Rajadamnern Avenue
Bangkok

+ United Kingdom

HALL, Dr. D.N.F.
Principal Fisheries Adviser
Ministry of Overseas Development
Eland House
Stag Place
London SW1E 5DH

x+ United States of America

SHOMURA, R.
Director
Biological Laboratory
National Marine Fisheries Service
Honolulu, Hawaii

STORER, Dr. J.A.
Special Assistant for International Fisheries
Office of the Associate Administrator for Marine Resources
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
Rockville, Maryland 20852

BROADHEAD, G.C.
President
Living Marine Resources
11339 Sorrento Valley Road
San Diego, California 92121

FOLSOM, W.B.
Regional Fisheries Attaché for Africa
U.S. Consulate-General
B.P. 675
Casablanca, Morocco

OBSERVERS FROM MEMBER NATIONS
NOT MEMBERS OF THE COMMITTEES

Kenya

ODERO, N.
Director of Fisheries
Fisheries Department
Ministry of Tourism and Wildlife
P.O. Box 40241
Nairobi

KAMANDE, P.N.
Assistant Director of Fisheries
Ministry of Tourism and Wildlife
P.O. Box 90423
Mombasa

KINYENYE, I.A.
Assistant Secretary
Ministry of Tourism and Wildlife
P.O. Box 30027
Nairobi

Mauritius

ARDILL, J.D.
Director of Fisheries
Ministry of Fisheries
Port Louis

OBSERVERS FROM INTERGOVERNMENTAL ORGANIZATIONS

Inter-American Tropical Tuna Commission

KLAWE, W.L.
Senior Scientist
I-ATTC
c/o Scripps Institution of Oceanography
La Jolla, California 90237, U.S.A.

International Commission for the Conservation of Atlantic Tunas

MIYAKE, Dr. P.M.
Assistant Executive Secretary
ICCAT
General Mola 17
Madrid 1, Spain

FAO DEPARTMENT OF FISHERIES

POPPER, F.E.
Assistant Director-General (Fisheries)
FAO
Rome, Italy

WINSOR, H.C.
Programme Leader
International Indian Ocean Fishery
Survey and Development Programme
FAO
Rome, Italy

GULLAND, Dr. J.A.
Chief, Aquatic Resources Survey
and Evaluation Service
Fishery Resources Division
FAO
Rome, Italy

HAYASI, S.
Senior Fishery Officer (Resource
Management Specialist)
International Indian Ocean Fishery
Survey and Development Programme
FAO
Rome, Italy

HENDERSON, J.D.M.
Senior Fishery Liaison Officer
FAO
Rome, Italy

BUTLER, L.
Fishery Statistician
FAO
Rome, Italy

KEARNEY, Dr. R.E.
Consultant
International Indian Ocean Fishery
Survey and Development Programme
FAO
Rome, Italy

SECRETARIAT

<u>Host Government</u>	
Liaison Officer	N. Odero
<u>FAO</u>	
Secretary	J.A. Gulland
Assistant Secretary	S. Hayasi
Meetings Officer	Mary Clare de Freitas

* * * * * *

Appendix B

AGENDA

1 Opening of the meeting

2 Adoption of the agenda and arrangements for the meeting

3 Review of the current knowledge of the state of the stocks of tuna in the Indian Ocean and Western Pacific

4 Requirements for statistical and other data, and steps needed to fulfil them

5 Possible management measures

6 Any other matters

7 Date and place of the next meeting

8 Adoption of report

* * * * * *

Appendix C

LIST OF DOCUMENTS

IOFC:TM/75/1 IPFC:TM/75/1		Provisional agenda
	2	Annotated provisional agenda
	3	Provisional timetable
	4	Report of the Second Session of the IPFC/IOFC Ad Hoc Working Party of Scientists on Stock Assessment of Tuna
	4, Sup.1	Summary of statistics of landings (catches) of tuna from the Indian Ocean
	5	Inadequacy of statistics and methods of improvement
IOFC:TM/75/Inf.1 IPFC:TM/75/Inf.1		List of documents
	2	Information for participants
	3	Report of the Second Joint Meeting of the IPFC Special Committee on Management of Indo-Pacific Tuna and the IOFC Committee on Management of Indian Ocean Tuna
	4	A proposal for a skipjack survey and tagging programme in the central and western equatorial Pacific Ocean
	5	An assessment of the South Pacific albacore, Thunnus alalunga, fishery, 1953-72
	6	List of delegates and observers
	7	Further investigation of the population dynamics of the South Pacific albacore fishery
	8	Tuna population dynamics research in the U.S.A.
	9	ICCAT's experience in improvement of tuna statistics in the Atlantic
	10	Report of the Special Southern Bluefin Tuna Working Party
	11	Notes on the 1974-75 tuna season in Australia
	12	Hypothetical habitat of skipjack tuna based on temperature and oxygen requirements

* * * * * *

SUMMARY OF STATISTICS OF LANDINGS (CATCHES) OF TUNA FROM THE INDIAN OCEAN 1/

Table 1

Revised catches by countries

Species	Gear	Country	1971	1972	1973	1974
Albacore (T. alalunga)	longline	Japan (a)	2.9	1.1	1.8	
		Korea, Rep. of (a)	2.1	3.6	9.0	9.2
		U.S.S.R. (b)	0.6	0.6	0.9	
		Other	5.0			
	surface	Reunion	0.1			
Bigeye tuna (T. obesus)	longline	Japan (a)	10.8	8.9	5.1	
		Korea, Rep. of (a)	4.1	4.3	5.6	13.6
		Sri Lanka	0.1	0.1	0.1	
		U.S.S.R. (b)	1.1	0.8	0.6	
		Other	6.5			
Yellowfin tuna (T. albacares)	longline	Japan (a)	12.9	7.8	3.4	
		Korea, Rep. of (a)	6.5	9.6	9.2	11.6
		Sri Lanka	0.2	0.1	0.1	
		U.S.S.R. (b)	1.7	1.7	0.9	
		Other	13.1			
	surface	Australia	0.1	0.1		
		India	0.2	0.2	0.2	0.2
		Madagascar		0.2	0.5	1.7
		Maldives (c)	1.3	5.0	5.2	
		Pakistan	0.2	0.3	0.2	
		Sri Lanka	3.8	5.1	5.0	
Southern bluefin (T. maccoyii)	longline	Japan (a)	22.6	20.1	19.5	
		Korea, Rep. of (a)	0.5	0.1	0.1	0.2
	surface	Australia	7.8	10.4	8.6	6.9
Skipjack (K. pelamis)	longline	Japan (a)	0.1	0.2	0.0	
		Korea, Rep. of (a)	0.1	0.1		
	surface	Australia	0.0	0.1	0.1	
		Bangladesh	0.7	0.9		
		India	5.1	4.8	4.8	
		Madagascar		3.3	4.5	10.0 (d)
		Maldives (c)	28.9	16.0	20.0	
		Pakistan	6.0	8.1	5.8	
		Sri Lanka	9.8	12.4	10.5	
		Indonesia	(13)	(15)		

(a) Based on more recent official figures (from FAO)
(b) Figures from FAO Yearbook divided by species on the basis of Korean catch figures for the whole Indian Ocean (area 51)
(c) Recent figures from Maldive Government but not identical to those given to FAO
(d) Unconfirmed report

1/ Modified from Appendix 4 of the Report of IPFC/IOFC Ad Hoc Working Party of Scientists on Stock Assessment of Tuna, Nantes, France, 16-18 September 1974, FAO Fisheries Report No. 152

Species	Gear	Country	1971	1972	1973	1974
Little Tuna (*E. affinis*)	surface	India	0.3	0.3	0.3	
		Maldives	0.4	0.6	1.0	
		Pakistan	0.1	0.1	0.1	
		Sri Lanka	2.4	2.3	2.0	
Frigate Mackerel (*A. thazard*)	surface	Bangladesh	0.7	0.5		
		India	0.2	0.2	0.2	
		Maldives	26.9 (e)	3.1	6.2	
		Pakistan	5.6	4.9	5.5	
		Sri Lanka	3.2	4.1	3.8	
Tuna (not specified or included elsewhere)		India	5.4 (i)	4.9 (i)	22.5 (j)	
		Maldives (f)	1.4	7.5	1.3	
		Reunion	0.4	0.5	0.4	
		Tanzania	0.8	1.6	0.8	
		Yemen (Dem.Rep.) (g)	7.5	9.4	8.9	
		Yemen (Arab Rep.) (h)			0.3	

(e) Considered to be a reporting error and should probably be 2.69
(f) Includes *Gymnosarda nuda* and *Thunnus tonggol* but percentage composition unknown
(g) Yemen figures may include some figures from U.S.S.R. vessels
(h) Species given as the unlikely mixture of skipjack and bigeye
(i) Redistributed in previous tables as given at Nantes Meeting 1974
(j) Official figure but not in keeping with previous years' data and grossly different from that given at Nantes Meeting 1974

NUMBER OF TAIWANESE LONGLINE BOATS REGISTERED WITH FAR EASTERN SHIPPING SERVICE

CALLING AT PENANG EACH MONTH

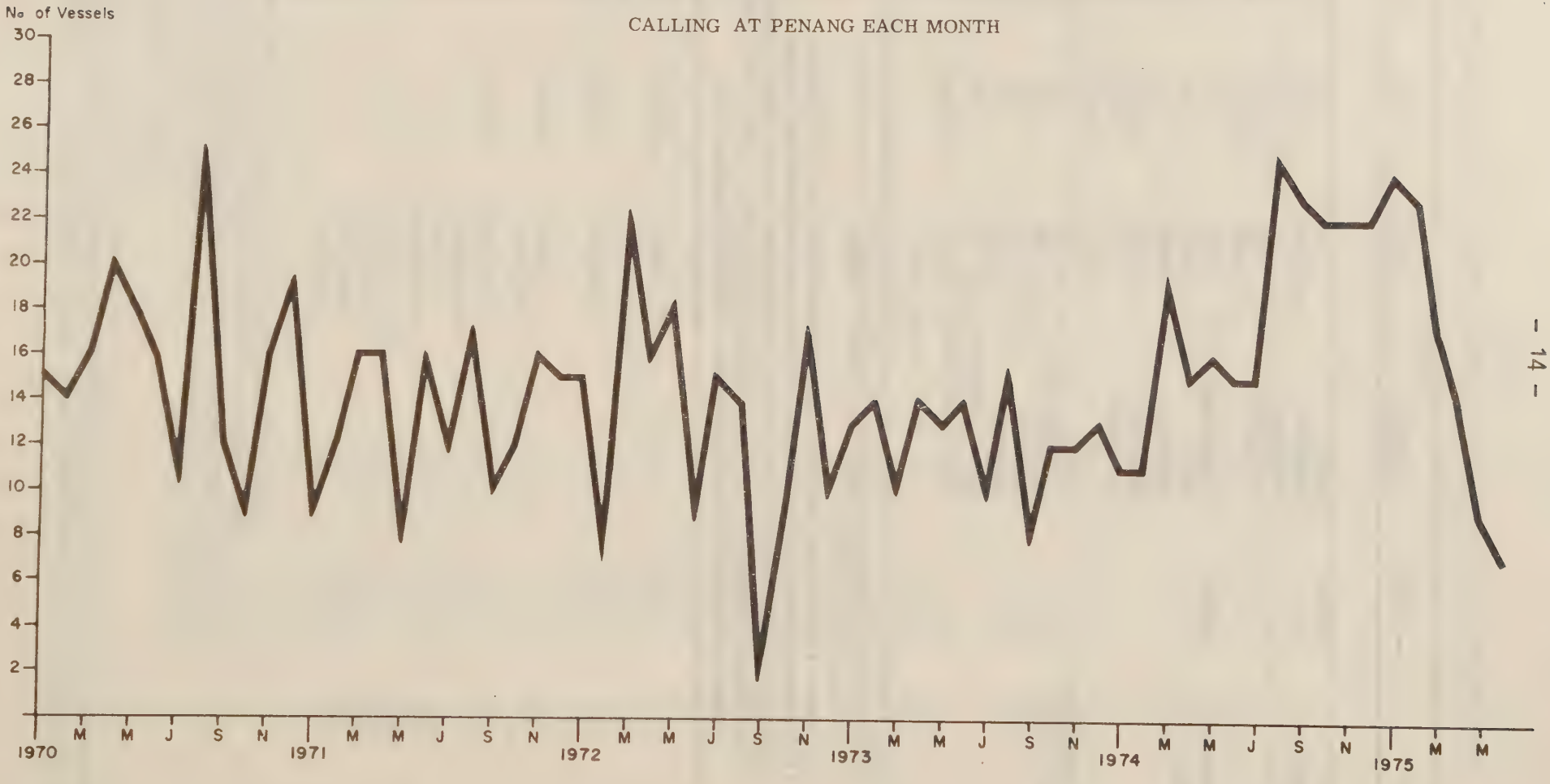


Table 2

Unloadings to Malaysian marine industries (Penang) by Taiwanese longline vessles

All total figures have been rounded to the nearest ton

	No. of Vessels	Total Catch		Yellowfin			Albacore			Bigeye			Marlin			Swordfish			Others		
		Total	Boat	Total	Boat	%	Total	Boat	%	Total	Boat	%	Total	Boat	%	Total	Boat	%	Total	Boat	%
1971																					
Jan-March	46	2 712	58.96	649	14.12	23.94	1 111	24.15	40.95	463	10.07	17.08	211	4.59	7.78	18	0.39	0.66	260	5.65	9.59
Apr-June	38	2 017	53.08	983	25.88	48.75	239	6.30	11.86	296	7.79	14.68	233	6.13	11.55	24	0.62	1.17	242	6.36	11.98
July-Sept	12	807	67.26	395	32.90	48.92	55	4.55	6.76	201	16.75	24.90	63	5.25	7.81	6	0.48	0.71	88	7.35	10.93
Oct-Dec	8	391	48.85	242	30.24	61.90	9	1.17	2.39	90	11.30	23.13	26	3.25	6.65	5	0.05	0.11	23	2.83	5.80
1972																					
Jan-March	27	1 593	59.01	897	33.22	56.30	157	5.83	9.87	301	11.16	18.92	76	2.81	4.77	24	0.89	1.51	137	5.09	8.62
Apr-June	19	1 082	56.93	441	23.23	40.81	120	6.31	11.08	318	16.76	29.44	87	4.58	8.04	13	0.67	1.18	103	5.40	9.48
July-Sept	22	1 305	59.31	567	25.76	43.44	249	11.33	19.11	348	15.81	26.66	60	2.73	4.60	12	0.54	0.90	69	3.12	5.26
Oct-Dec	13	695	53.44	229	17.64	33.00	268	20.62	38.58	131	10.07	18.85	14	1.08	2.02	5	0.40	0.75	47	3.63	6.80
1973																					
Jan-March	30	2 232	74.39	832	27.74	37.29	835	27.85	37.44	362	12.07	16.23	71	2.37	3.18	20	0.66	0.89	111	3.71	4.99
Apr-June	26	1 839	70.74	796	30.62	43.28	669	25.74	36.38	257	9.90	14.00	36	1.38	1.96	10	0.40	0.57	70	2.69	3.81
July-Sept	18	1 136	63.13	318	17.64	27.94	469	26.06	41.27	241	13.38	21.19	22	1.22	1.94	18	0.99	1.56	69	3.84	6.08
Oct-Dec	13	1 190	91.56	388	29.83	32.58	487	37.43	40.88	287	22.05	24.08	8	0.62	0.67	3	0.22	0.24	18	1.40	1.53
1974																					
Jan-March	21	1 801	85.74	343	16.32	19.03	1 231	58.62	68.37	189	9.02	10.51	12	0.57	0.67	5	0.23	0.27	21	0.99	1.15
Apr-June	23	1 154	50.16	156	6 79	13.55	736	31.99	63.77	182	7.93	15.81	35	1.52	3.03	11	0.48	0.95	34	1.47	2.93
July-Sept	33	1 983	60.09	205	6.22	10.35	1 351	40.95	68.14	312	9.44	15.71	40	1.21	2.02	28	0.83	1.39	48	1.45	2.41
Oct-Dec	50	2 115	42.30	317	6.33	14.97	1 088	21.76	51.44	470	9.40	22.23	113	2.25	5.34	37	0.74	1.73	91	1.82	4.29
1975																					
Jan-March	40	1 541	38.53	356	8.91	23.12	805	20.17	52 21	280	7.01	18.20	44	1.10	2.85	18	0.46	1.19	38	0.94	2.45

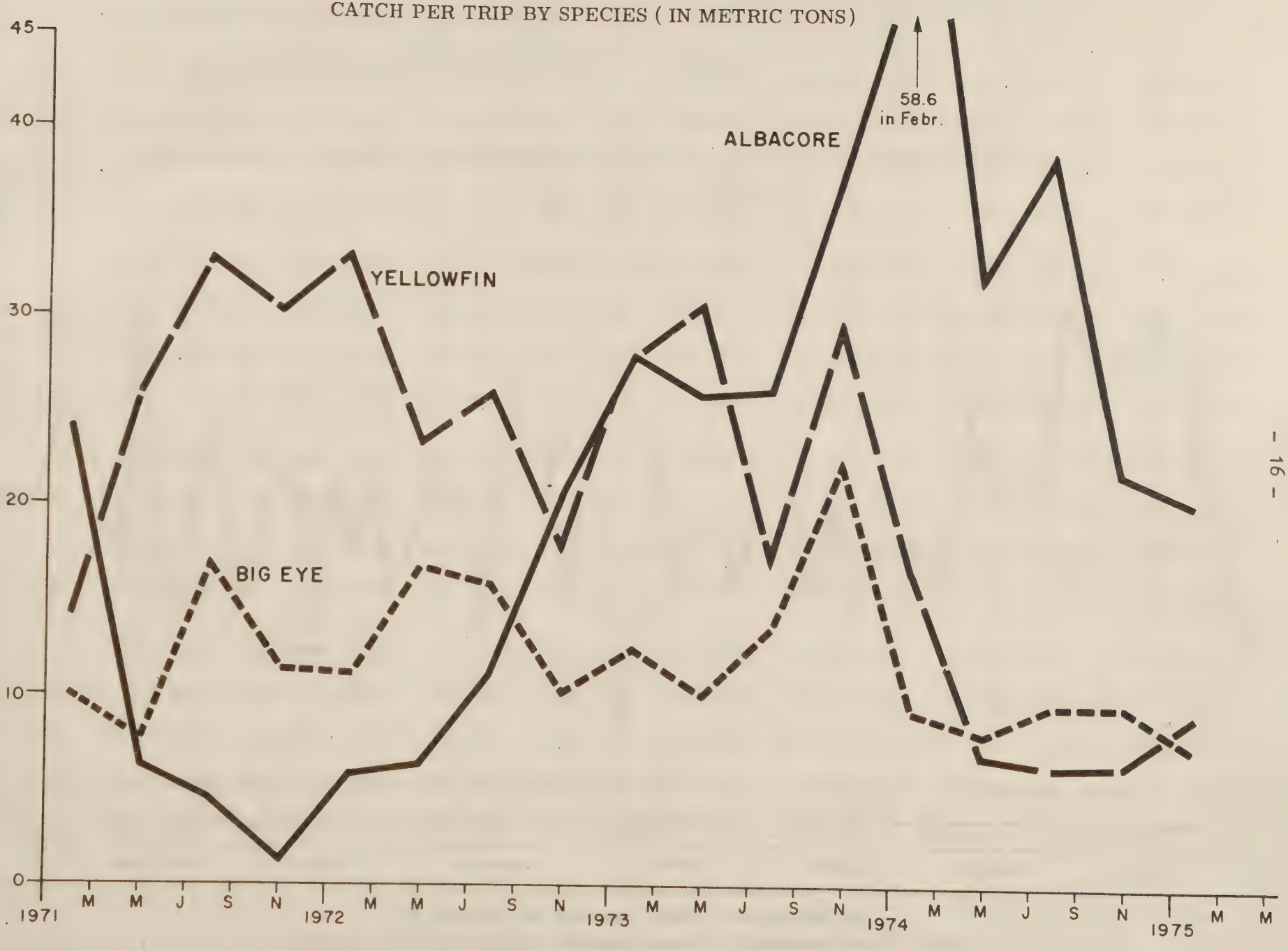

CATCH PER TRIP BY SPECIES (IN METRIC TONS)
45
40
30
20
10
0
ALBACORE
58.6
in Febr.
YELLOWFIN
BIG EYE
1971
M M J S N
1972
M M J S N
1973
M M J S N
1974
M M J S N
1975
M M

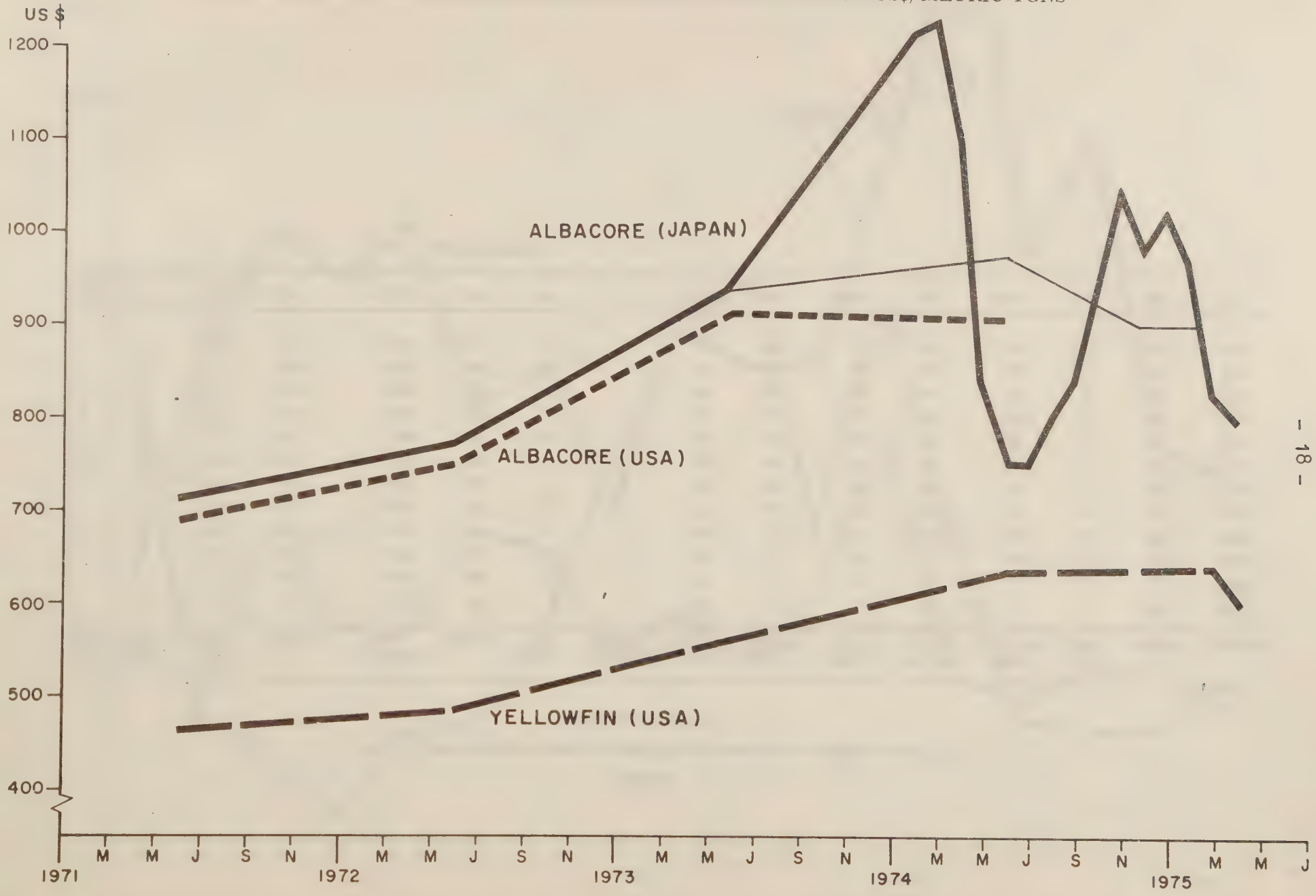
Table 3

Catch of tuna longline fishery by species and month in the Indian Ocean (1974)

Unit in metric tons

Month	No. of boats	Sub-total	Albacore	Yellowfin tuna	Bigeye	Blue-fin	Southern bluefin	Green marlin	Blue marlin	Yellow marlin	White marlin	Other marlins	Skip-jack	Sharks	Others
1	18	2 932	726	1 151	615	7	-	10	3	-	149	2	-	24	245
2	5	1 152	401	294	264	-	-	10	5	3	31	3	-	3	138
3	18	1 982	315	786	555	3	-	47	7	5	7	18	5	25	209
4	24	2 427	192	926	782	-	-	84	39	7	19	33	14	85	246
5	31	3 728	245	1 256	1 409	23	-	83	32	56	123	33	-	50	418
6	43	4 623	668	1 494	1 266	8	18	102	46	14	181	63	7	51	705
7	27	3 089	1 186	469	880	-	5	27	65	12	41	11	2	79	312
8	45	4 769	1 931	984	1 101	50	-	55	73	13	8	44	-	107	403
9	43	4 097	1 272	949	1 195	-	-	173	144	-	50	18	5	33	258
10	38	3 006	608	601	1 140	11	-	68	72	22	30	30	8	39	377
11	50	4 050	664	1 087	1 629	3	-	37	72	37	69	24	4	112	312
12	67	6 103	998	1 566	2 522	77	-	73	81	-	92	64	44	134	492
Total	409	41 958	9 206	11 563	13 358	182	23	769	639	169	800	343	49	742	4 115

AVERAGE EX-VESSEL PRICES OF SELECTED TUNA SPECIES IN US$/METRIC TONS



TOTAL CATCH / BOAT / TRIP
Metric tons
90
80
70
60
50
40
30
20
0
M M J S N M M J S N M M J S N M M J S N M M J
1971
1972
1973
1974
1975

CATCHES BY KOREAN LONGLINERS

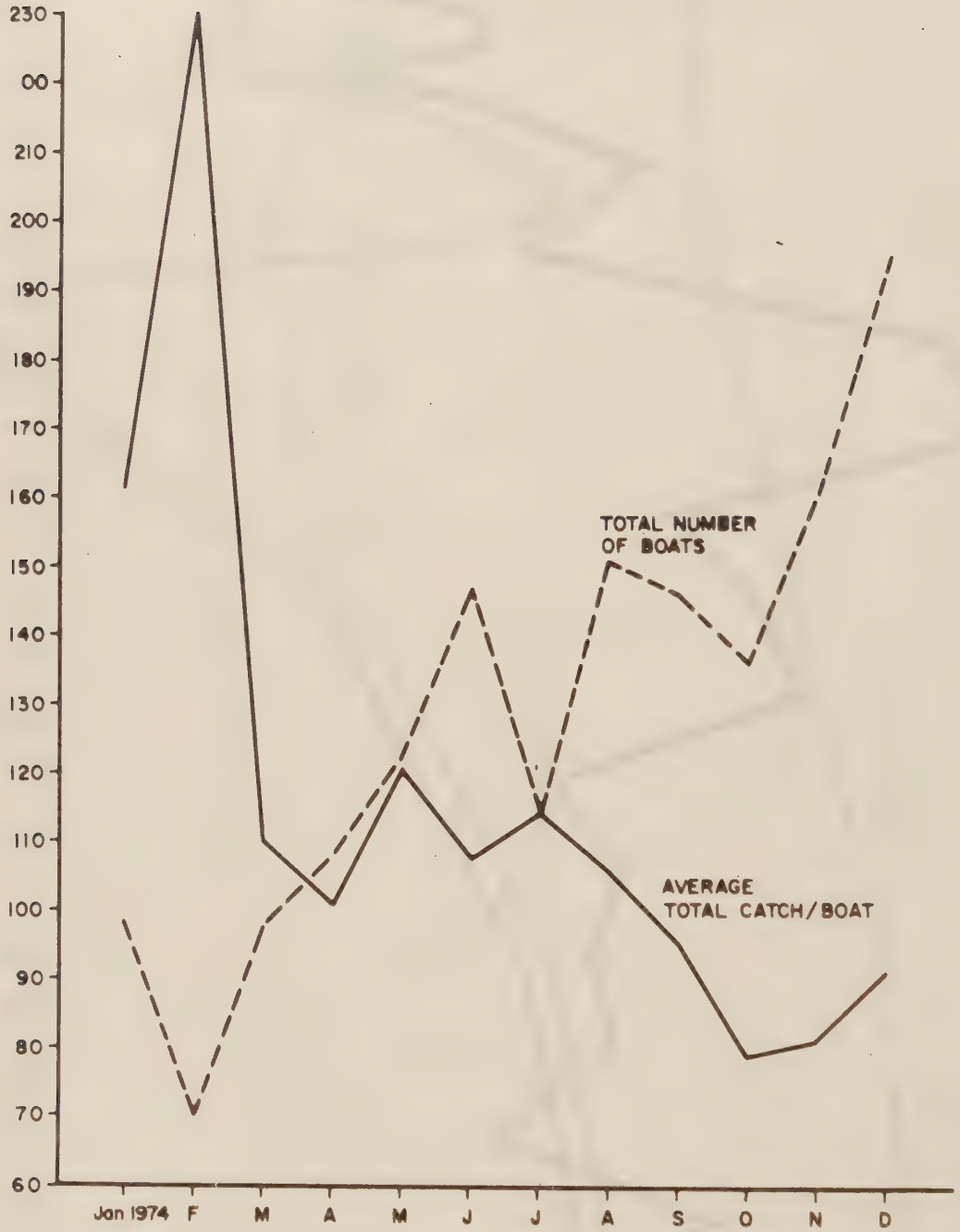


Table 4

Korean longline catches for 1974
(in metric tons)

	No. of boats	Total		Albacore		Yellowfin		Bigeye	
		Total	Av/boat	Total	Av/boat	Total	Av/boat	Total	Av/boat
January	18	2 932	162.9	726	40.3	1 151	63.9	615	34.2
February	5	1 152	230.4	401	80.2	294	58.8	264	52.8
March	18	1 982	110.1	315	17.5	786	43.7	555	30.8
April	24	2 427	101.1	192	8.0	926	38.6	782	32.6
May	31	3 728	120.3	245	7.9	1 256	40.5	1 409	45.5
June	43	4 623	107.5	668	15.5	1 494	34.7	1 266	29.4
July	27	3 089	114.4	1 186	43.9	469	17.4	880	32.6
August	45	4 769	106.0	1 931	42.9	984	21.9	1 101	24.5
September	43	4 097	95.3	1 272	29.6	949	22.1	1 195	27.8
October	38	3 006	79.1	608	16.0	601	15.8	1 140	30.0
November	50	4 050	81.0	664	13.3	1 087	21.7	1 629	32.6
December	67	6 103	91.1	998	14.9	1 566	23.4	2 522	37.6

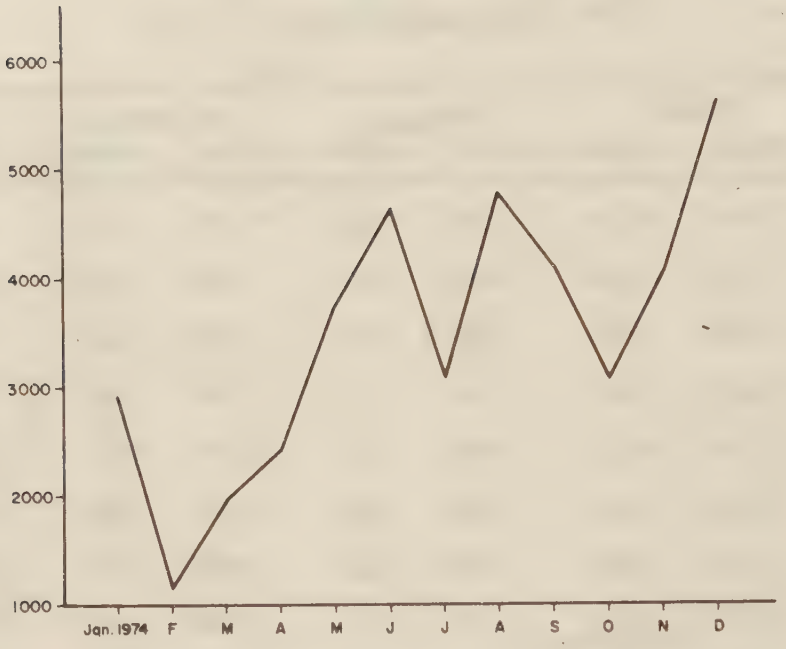
Table 5

Catches in metric tons by Korean longliners
in the Indian Ocean 1/

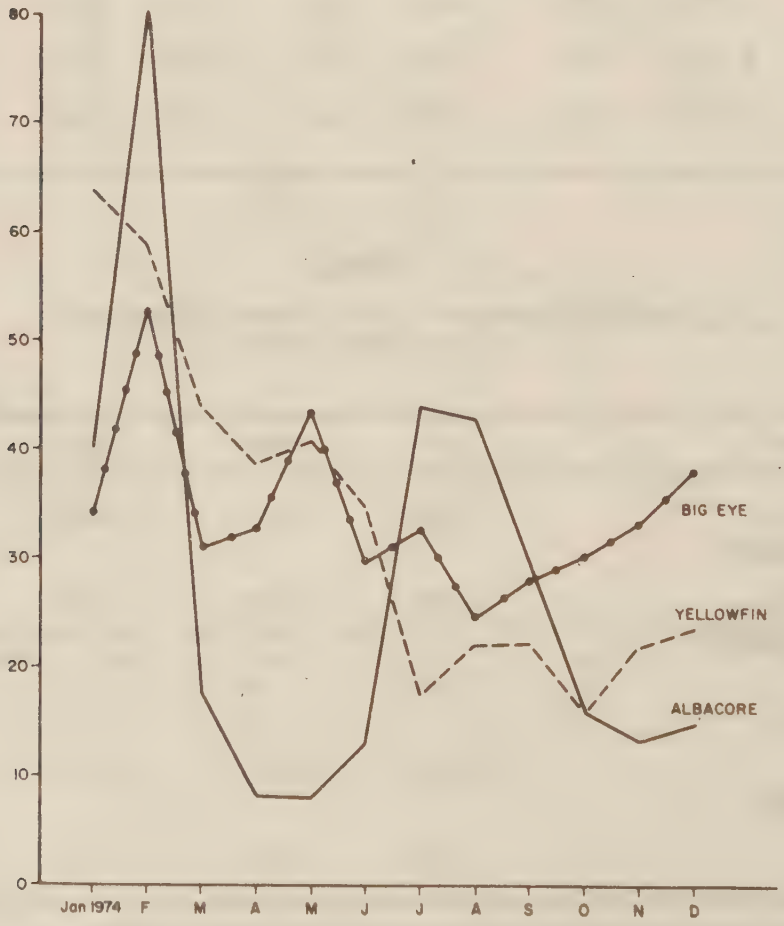
Species	1971	1972	1973	1974
Albacore (T. alalunga)	2 108	3 601	8 988	9 206
Yellowfin (T. albacares)	6 474	9 850	9 233	11 563
Bluefin (T. spp.)	537	72	55	182
Bigeye (T. obesus)	4 057	4 337	5 612	13 358
Marlin	719	1 151	1 250	2 747

1/ Figures from the Office of Fisheries, Republic of Korea

TOTAL CATCH BY MONTH FOR KOREAN LONGLINE VESSELS



AVERAGE CATCH (PER VESSEL) BY SPECIES FOR KOREAN LONGLINERS (1974)



Appendix E

1974-75 TUNA SEASON IN AUSTRALIA

INTRODUCTION

This paper has been prepared to inform members of the joint committees of important changes in the Australian tuna fishery, namely the successful introduction of purse-seining, the landing of significant quantities of skipjack tuna, and the introduction of interim management measures. Unfortunately the data for the season is still coming in so the material herein must be regarded as provisional; however, about 80% of the data is at hand so, though a definitive report will differ in detail, it will not differ in substance. This interim report will briefly consider the general statistics, and focus in greater detail on the sizes of bluefin taken during the 1974-75 season.

NEW SOUTH WALES

Summary of catches

The past three years of fishing are summarized in Table 1. They reflect three significant changes in the fishery. These are:

Large catches by purse seiners. Of these catches 1 208 metric tons (M/T) of bluefin and 1 130 M/T of skipjack were taken by a single vessel

Large catches of skipjack, primarily by purse seine for the first time

Several bait boats learned to successfully pole skipjack. Most of the skipjack taken by both methods were small (45-55 cm; 4-8 lbs), but during April one vessel began catching large skipjack (ca. 18 lbs) well offshore of New South Wales

What had been a reasonably predictable industry for well over a decade may be in a state of rapid transition. It is not possible to forecast the outcome, but the changes suggest that with proper management Australia can become self sufficient in tuna, and could possibly develop into a major exporter of processed and frozen tuna.

It should also be noted that the developments outlined above are temporarily painful as they coincide with a period when the world and our domestic marketing systems are in disarray, because of a glut of overpriced product, caused by very high prices for the raw material a year and one-half ago. This situation will probably change in 6-10 months, and we will see a reversion to the long-term trend of increasing world consumption of tuna.

Sizes of southern bluefin

The 1973-74 season was quite abnormal. Relatively small catches of older fish were taken well offshore. The 1974-75 season was even more unusual with large, old fish dominating the catch by weight, and comprising about half the catch by number.

The years can be more easily compared when the length data are translated into ages as in Table 2, which is from Hynd (1974) with the last season added. In addition to very large fish being more abundant, younger, smaller fish in the 2+ and 3+ age groups were also more abundant than in 1973-74.

What these changes in size composition mean with respect to the stock as a whole is unclear. The bluefin is a very wide ranging animal, and relative to its total range the New South Wales fishery must be regarded as a point. In such fisheries relatively slight changes in distribution from year to year can generate dramatic changes in apparent abundance and size distribution.

Table 1

New South Wales tuna catches for the past three seasons

All catches in metric tons

	(Season 1 July - 31 January) [1]		
	1974-75	1973-74	1972-73
Bluefin Bait	3 236	1 783	6 067
Purse	1 950	-	-
Total	5 186	1 783	6 067
Skipjack Bait	209	some [2]	-
Purse	1 875	some [2]	-
Total	2 084	-	-
Grand Total	7 270	1 783	6 067

[1] During the past season (1 February - 15 April) bait boats landed 124 tons of bluefin and 291 tons of skipjack

[2] Data not available in sufficient precision to include

Table 2

Change in size composition of the catch

Estimated numbers of each age group of southern bluefin tuna taken during the 1973-74 and 1974-75 season in New South Wales compared with similar data from 1966-67 and 1967-68 years, which are representative of the usual age composition found in the New South Wales fishery.

Year	2+	3+	4+	5+	6+	7+	8+	Total Number	Weight M/T
1974-75	6 340	128 416	43 287	55 095	56 023	7 197	286	294 644	4 703
1973-74		5 215	1 044	66 010	7 056	403	129	79 893	1 810
1967-68	1 086	342 867	43 708	1 058				388 719	3 659
1966-67	15 166	80 302	63 780	8 297	567			168 112	2 142

Fig. 1: Size frequencies of bluefin tuna caught off New South Wales. The dotted line is percent by weight, and the solid line is percent by number. An age length key is as follows:
2 + 40 - 61 ; 3 + 62 - 80 cm ; 4 + 81 - 97 cm ; 5 + 98 - 112 cm ; 6 + 113 - 125 cm ; 7 + 126 cm.

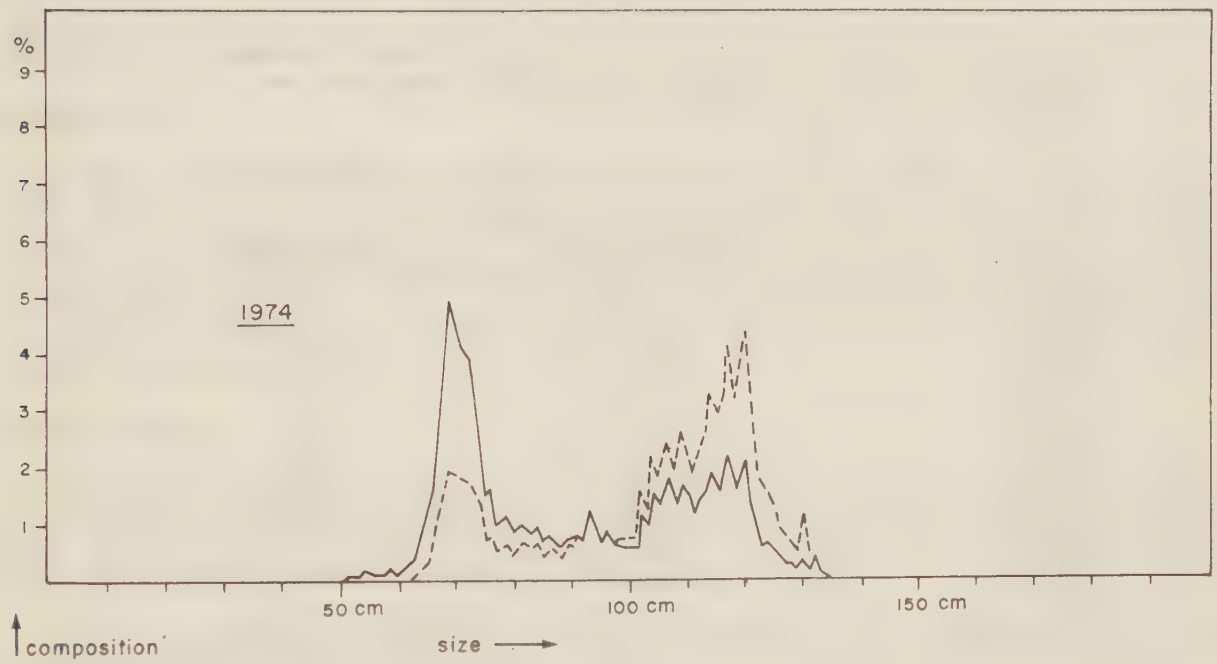


Table 3

Comparison by ages, of identified catches of bait and purse seine boats during September to December 1974

The percentages are based on 3 525 purse seine tuna and 7 058 bait boat tuna.

	2+	3+	4+	5+	6+	7 and older
Purse seine	.3	10.8	6.8	26.9	48.7	6.4
Bait boat	.3	42.4	13.5	21.5	19.5	2.7

Table 4

Comparison of live bait catches (Eden) and purse seine catches (Melbourne)

The data are in 10 cm sizes instead of ages as in Table 3, because they have not yet been computerized, a necessary first step for a more sophisticated presentation.

Length	Percent Bait boats	Purse seine
40–49	.03	.04
50–59	9.96	1.94
60–69	29.87	17.03
70–79	23.70	15.19
80–89	6.47	5.10
90–99	6.16	5.42
100–109	8.52	14.58
110–119	10.25	27.20
120–129	4.40	11.70
130–139	0.60	1.71
140–149	0.04	0.06
150+	+	0.01

Table 5

Age composition of the South Australian bluefin tuna catch for the same years as the New South Wales catch detailed in Table 2

Year	2+	3+	4+	5+	6+	Total Number	M/T
1974–75	210 971	250 825	70 016	8 269	350	570 431	4 842
1973–74	305 480	307 673	123 175	14 140		501 000	6 833
1967–68	12 618	186 668	52 583	5 330		257 000	2 943
1966–67	8 641	121 683	102 369	11 456		244 000	3 424

It is very desirable to estimate the impact of the purse seiners on our pole fleet and the Japanese longline fleet. An indirect way of doing this is to compare the sizes of fish taken. Unfortunately our sampling system is based on the processing line and not the unloading dock so it is usually not possible to identify a block of fish in the cannery with a particular vessel; however, for the September to December period we have 19 identified purse seine catches, and 33 identified bait boat catches. They are summarized in Table 3, and show a definite preference for large fish on the part of the purse seiners, or avoidance of large fish by the pole boats.

A second, more massive comparison is fortuitously possible because, of the 2 000 tons delivered to SAFCOL in Melbourne, most were taken by purse seine. We have subtracted known bait boat catches from the Melbourne data and added them to the Eden data, and similarly have subtracted identified purse seine catches from Eden and added them to Melbourne. The result is a bait boat sample (Eden) that is close to pure bait boat catches, and a purse seine sample (Melbourne) that is probably over 75% purse seine. The results are given in Table 4.

This analysis is completely consonant with Table 3, and again shows that the purse seiners catch more large fish and fewer small fish than the bait boats. The most logical hypothesis is that the purse seiners take what comes to hand and that the bait boats avoid large fish.

Conclusions

There is no way with the data at hand to specify to what extent, if any, the 74-75 purse seiners competed at sea with the bait boats. It is clear from the size of distributions that competition, if any, was less than 100%. The converse of this is that the presence of the seiners resulted in a higher bluefin catch than would have been obtained had the seiners not operated, in addition to the not inconsiderable catch of skipjack that was nearly all made by the seiners. It can also be concluded that in the 74-75 season the bait boats and purse seiners were in competition with the longline fisheries, the purse seiners more so than the bait boats.

SOUTH AUSTRALIA

The South Australian fishery (December 74-June 75) was relatively undistinguished. The age composition for 74-75 (Table 5), comparing the same four years as for New South Wales (Table 2), is not markedly different than earlier years, with bias towards younger fish. The total catch in M/T was about average during 1974-75.

With the exception of taking 139 M/T of skipjack, purse seiners did not participate in the South Australian tuna fishery (bait boats took an additional 60 M/T of skipjack).

WESTERN AUSTRALIA

The Western Australian catch was very small (624 M/T). The age distribution was as follows: (previous years are not available yet)

2+	90	967
3+	28	159
4+		434

The catch was made in the near vicinity of Albany and Esperance. At Albany the entire catch, 44 119 fish was comprised of two year olds. At Esperance three's and four's were also taken. The total landed weight was only 624 M/T, almost certainly lower than the potential owing to a glut of tuna on the Australian market. Purse seine vessels did not participate in the fishery, though some exploratory fishing was done on the west coast.

MANAGEMENT

Australia is particularly concerned that unchecked expansion of a purse seine fishery for southern bluefin tuna may result in a substantial increase in the rate of exploitation of it. To provide an opportunity for careful assessment of the effectiveness of this technique in the fishery and of the nature of the catch, Australia has decided to place an interim ban on the entrance of further purse seine vessels in the fishery. As a result, only six purse seine vessels will be able to operate in the forthcoming season and it is unlikely that more than two will in fact participate.

Their operations and catches will be carefully recorded and examined. At the same time, operations and catches of the live bait and pole fishery will be closely monitored for comparison. The studies will cover economic as well as biological aspects.

Forewarning of the possible need for such a ban was given to industry in 1973 when prospective purse seine fishermen were warned not to take into account catches of southern bluefin tuna when assessing the economics of purse seine fisheries. Concurrent with the recent implementation of this interim ban, Australia has warned fishermen considering entry to the traditional live bait and pole fishery that they should not base their expectations of profitability on the taking of southern bluefin tuna because it may also become necessary to limit entry to this method of fishing in the future. This is associated with the fact that catches by that method have not risen recently despite steady increases in effort.

* * * * *

Australian Department of Agriculture
Canberra
July 1975

Appendix F

REPORT OF THE SPECIAL SOUTHERN BLUEFIN TUNA WORKING PARTY

OPENING OF THE MEETING

The Meeting was held at the Far Seas Fisheries Research Laboratory, Shimizu, Japan, 24-27 June 1975. S. Ueyanagi served as Chairman and S. Kume served as Rapporteur. A list of participants is included as Appendix 1. The Meeting adopted the agenda as shown in Appendix 2.

This Meeting was held in compliance with the recommendations of the Second Session of the IPFC/IOFC Ad Hoc Working Party of Scientists on Stock Assessment of Tuna (FAO Fisheries Report, No. 152), to conduct further studies and to up-date analyses of the dynamics of the southern bluefin fishery.

RECENT STATUS OF THE SOUTHERN BLUEFIN FISHERIES

Longline fishery

The history of the Japanese southern bluefin longline fishery was briefly reviewed using figures of Warashina and Hisade (1974) showing:

(1) Rather rapid expansion of fishing ground

(2) The relation between catch and effort (Fig. 1)

(3) The catch in number of age (Fig. 2)

It is noted that the recent longline size composition indicates an increased catch of small-sized fish, while in earlier stages of the fishery large-sized fish were more predominant in the catch. The voluntary regulatory measures on the stock taken by Japanese fishermen since 1971 were considered, and to date the effect of the regulation does not seem to be measurable. Fishing effort increased in the 1972 fishing season but decreased in the following season to the level of the 1970 fishing season with a similar catch. The value of the 1974 fishing season is provisional.

Several questions were raised and discussed:

(1) The Australian scientist raised a question concerning stock structure; there occur three-year-olds and even two-year-olds in the area off South Africa, which may indicate a possibility that some portion of the recruiting juveniles do not go through the coastal waters off Southern Australia

(2) A decline in the amount of effort in the last two years (Fig. 1) was explained as a result of the shift of the longline fleet to the Atlantic bigeye and bluefin fishing ground coupled with economic problems due to oil prices

(3) Regarding a stable catch since the mid-1960's despite considerable increase of longline effort, gear competition was suggested

Surface fishery

Qualitative changes in the surface fishery in the past two years were explained (WD 1). It is observed that the drastic change in size composition to more large fish (4+ - 6+)

Fig. 1: Relation between fishing effort and catch of southern bluefin tuna in longline fishery. Attached numerals indicate fishing years and radial lines the levels of catch per hook.

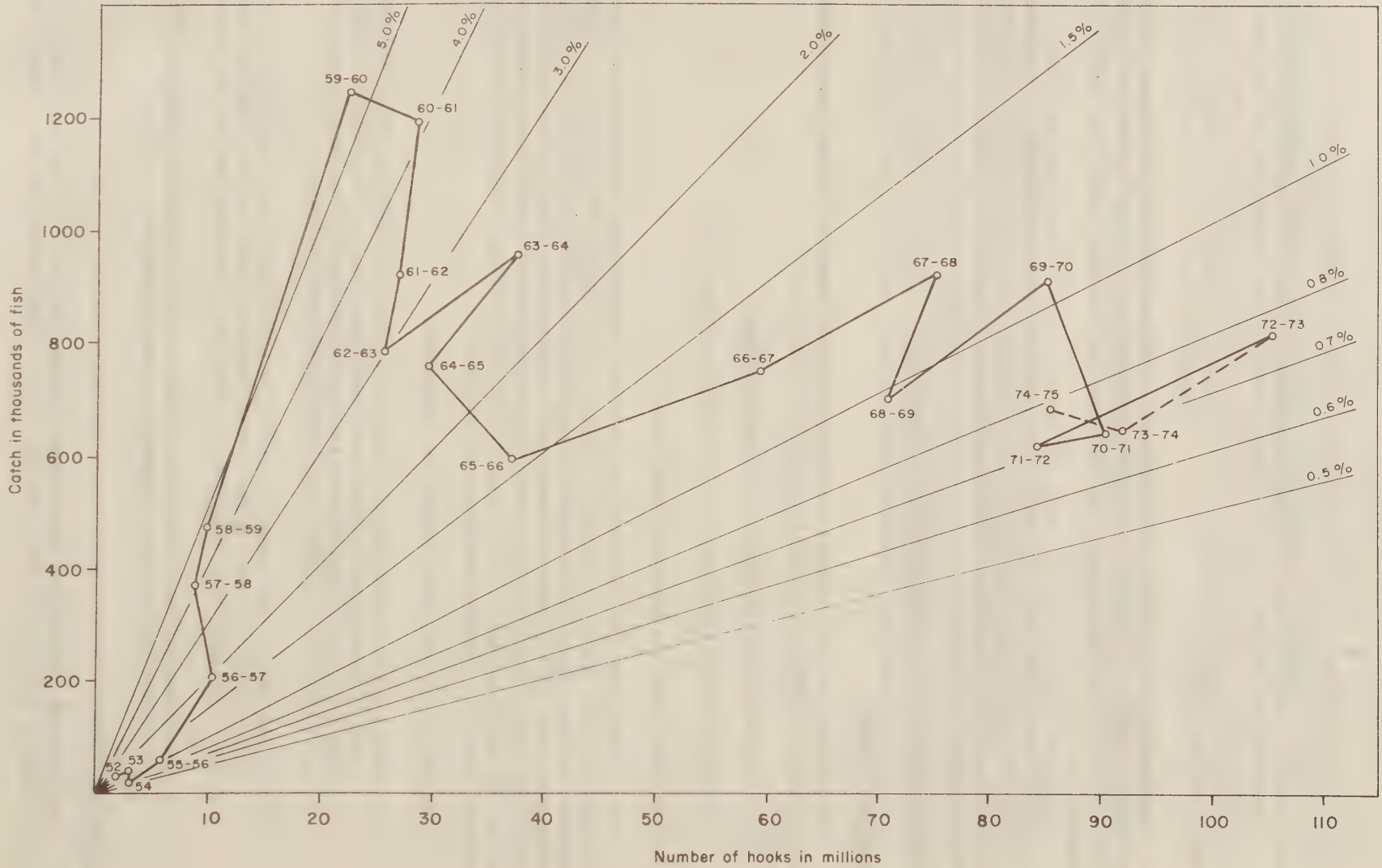


Fig. 2: Longline catch of southern bluefin tuna by year class.

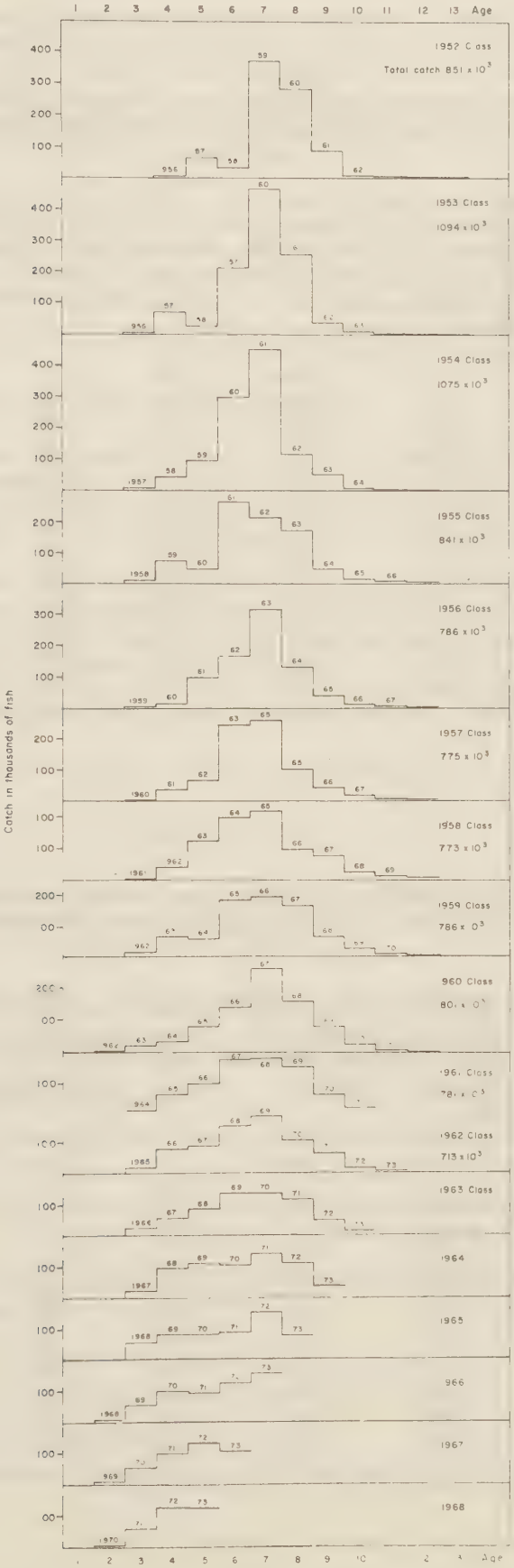


Table 1

Annual New South Wales southern bluefin tuna catches by boats exceeding 40 short tons (ST) or 8 ST/half month if catch exceeds 20 ST

Year	No. of standard boats (SB)	No. of half months standard boats fished	Weight of catch (ST) of these boats	Catch (ST) per SB/half month	Annual catch (ST)	Equivalent No of SB half months	Estimated No of fish caught	No. of fish caught per SB/half month
1962	19	73	1 340	18.4	1 524	83	108 000	1 300
1963	12	71	2 696	38.0	2 877	76	199 000	2 620
1964	26	149	1 913	12.8	2 506	195	277 000	1 420
1965	26	108	2 300	21.3	2 595	122	187 000	1 530
1966	21	103	2 180	21.2	2 362	112	168 000	1 500
1967	30	166	3 895	23.5	4 108	175	388 000	2 200
1968	41	289	5 002	17.3	5 990	346	676 000	1 950
1969	37	285	5 935	20.8	6 338	304	666 000	2 190
1970	29	207	3 350	16.2	3 981	246	472 000	1 920
1971	28	195	3 285	16.8	5 548	329	446 000	1 360
1972	32	177	3 806	21.5	6 761	314	376 000	1 200
1973	23	93	1 698	18.3	1 996	109	76 000	700
1974	30	175	3 344	19.1	5 881	308	336 000	1 090

Annual South Australian southern bluefin tuna catches by boats exceeding 40 short tons (ST) or 8 ST/half month if catch exceeds 20 ST

Year	No. of standard boats (SB)	No. of half months standard boats fished	Weight of catch (ST) of these boats	Catch (ST) per SB/half month	Annual catch (ST)	Equivalent No of SB half months	Estimated No of fish caught	No. of fish caught per SB/half month
1963	21	122	3 636	29.8	3 956	133	233 000	1 750
1964	20	160	6 070	37.9	6 070	160	394 000	2 460
1965	23	152	5 181	34.1	5 254	154	290 000	1 880
1966	33	185	6 582	35.6	6 604	186	425 000	2 290
1967	28	190	3 730	19.6	3 776	192	244 000	1 270
1968	25	180	3 238	18.0	3 245	180	257 000	1 430
1969	21	133	3 548	26.7	3 588	134	500 000	3 730
1970	12	77	2 005	26.0	2 085	80	321 000	4 010
1971	26	141	3 077	21.8	3 105	142	327 000	2 300
1972	20	138	4 666	33.8	4 821	143	404 000	2 830
1973	32	221	7 204	32.6	7 534	231	501 000	2 170
1974	39	295	7 482	25.4	7 699	304	750 000	2 470

than earlier years was partly due to the introduction of purse seine gear. In the 1974-75 season tenative catch statistics for New South Wales indicate 3 236 tons (M/T) of live-bait catch and 1 950 tons of purse seine catch. It is also stated that the fishery began to catch skipjack (about 2 000 tons) off New South Wales by purse seining: the average size of the skipjack being 55 cm in length and the water temperature ranging 14.5-17°C. Poor fishing in 1973 was thought to be due to the abnormally warm water.

Catch and standardized effort for the surface fishery was presented (Table 1). This is a better estimate than Fig. 7 in the Proceedings (FAO Fisheries Report, No. 152). Except for 1973, effort has been on the increase but the recent catch has levelled off. This may be related to competition between boats. It is noted that these revised statistics need further examination which is now underway. In the latest fishing season, four purse seiners were active in the tuna surface fishery, only one of which was equipped with a tuna purse seine net.

ASSUMED MODEL OF LIFE CYCLE AND ECOLOGICAL RESEARCH

As to the model of the migratory route of young to the fishery, the possibility of more than one source of recruits, raised previously, was again considered. It was emphasized that a careful study should be made, using all available information, including tagging data, to ascertain if all juveniles pass through Australian waters.

There is also a question as to why there has been no recovery of tagged large fish in the spawning area. The problem should be studied by calculating the theoretically expected recovery of tags in the spawning ground using most likely population parameters. It is noted that longline tag recovery must be under-estimated due to the low reporting of the captured tags, though the degree or the rate of under-reporting cannot be estimated. Reporting has probably been improving year by year.

The aging problem was discussed. Growth equations used by Japanese and Australian scientists are different:

Australia ..... $\ell t = 171.5\ (1-e^{-0.187(t-0.0)})$

estimated from tagging results by Lucas (1974)

Japan ..... $\ell t = 222.5\ (1-e^{-0.14(t-0.011)})$

calculated from the data by Robins (1963)

Re-examination of growth equations as well as the age/length key was recommended.

ESTIMATION OF THE FISHING MORTALITY, F

Cohort analysis

Japanese and Australian results on cohort analysis were presented in tabular form (Tables 2 and 3).

There are inconsistencies between the basic numbers used in the two analyses. The basic data of both analyses are:

Australia ..... on calendar year basis

* longline data are from FSFRL
* all surface data

Table 2

Estimates of fishing mortality rates from cohort analysis of combined Japanese and Australian data, 1945–46 to 1961–62 year classes

Backward solution, initial mortality rate: 0.1, M:0.2

Age	1949–50	50–51	51–52	52–53	53–54	54–55	55–56	56–57	57–58	58–59	59–60	60–61	61–62	62–63
2	0.0005	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0005	0.0008	0.0008	0.0011	0.0005
3	0.0764	0.0163	0.0023	0.0169	0.0224	0.0154	0.0069	0.0148	0.0249	0.0475	0.0526	0.0801	0.0938	0.0584
4	0.1289	0.0316	0.0032	0.0212	0.0340	0.0328	0.0114	0.0169	0.0520	0.0636	0.1091	0.0874	0.1402	0.1534
5		0.0117	0.0014	0.0069	0.0102	0.0108	0.0053	0.0063	0.0468	0.0246	0.0890	0.0600	0.1137	0.0822
6			0.0000	0.0008	0.0191	0.0017	0.0023	0.0154	0.0743	0.0758	0.2568	0.3123	0.2547	0.2455
7				0.1369	0.1915	0.0328	0.0890	0.2852	0.2074	0.3468	0.6694	0.8263	0.7143	0.6725
8					0.7268	0.3035	0.3935	1.0905	0.8992	0.6779	1.0667	1.3371	0.9261	1.1055
9						0.5162	0.6374	1.6966	1.5028	0.7991	1.3145	1.6084	1.6408	0.7997
10							0.5629	1.2508	1.0588	0.7179	0.8562	1.3023	1.6673	1.3438
11								0.7231	0.2455	0.2357	0.3160	0.3822	0.7936	0.7149
12									0.1271	0.0572	0.2016	0.3612		0.0417

Age	63–64	64–65	65–66	66–67	67–68	68–69	69–70	70–71	71–72	72–73
2	0.0020	0.0017								
3	0.1424	0.1518	0.1176							
4	0.1915	0.1537	0.2657	0.1869						
5	0.1558	0.1054	0.1134	0.1521	0.1033					
6	0.3545	0.2946	0.1762	0.1997	0.2327	0.1622				
7	0.7805	0.7133	0.4079	0.3728	0.5534	0.3300	0.4689			
8	1.0381	0.8208	0.5238	0.4533	0.9291	0.6059	0.7741	0.4991		
9	1.0854	0.8574	0.6252	0.6725	1.0539	0.7314	0.9950	0.8971	0.5327	
10	0.3319	0.8775	0.6877	0.6752	1.1742	0.7317	0.9721	1.5040	0.7430	0.2654
11	0.7668	0.0606	0.6160	0.7219	0.5956	0.8299	0.8675	1.0789	0.9874	0.3316
12	0.3444	0.2287	0.0334	0.4613	0.5251	0.2800	0.9715	0.8607	0.3886	0.4417

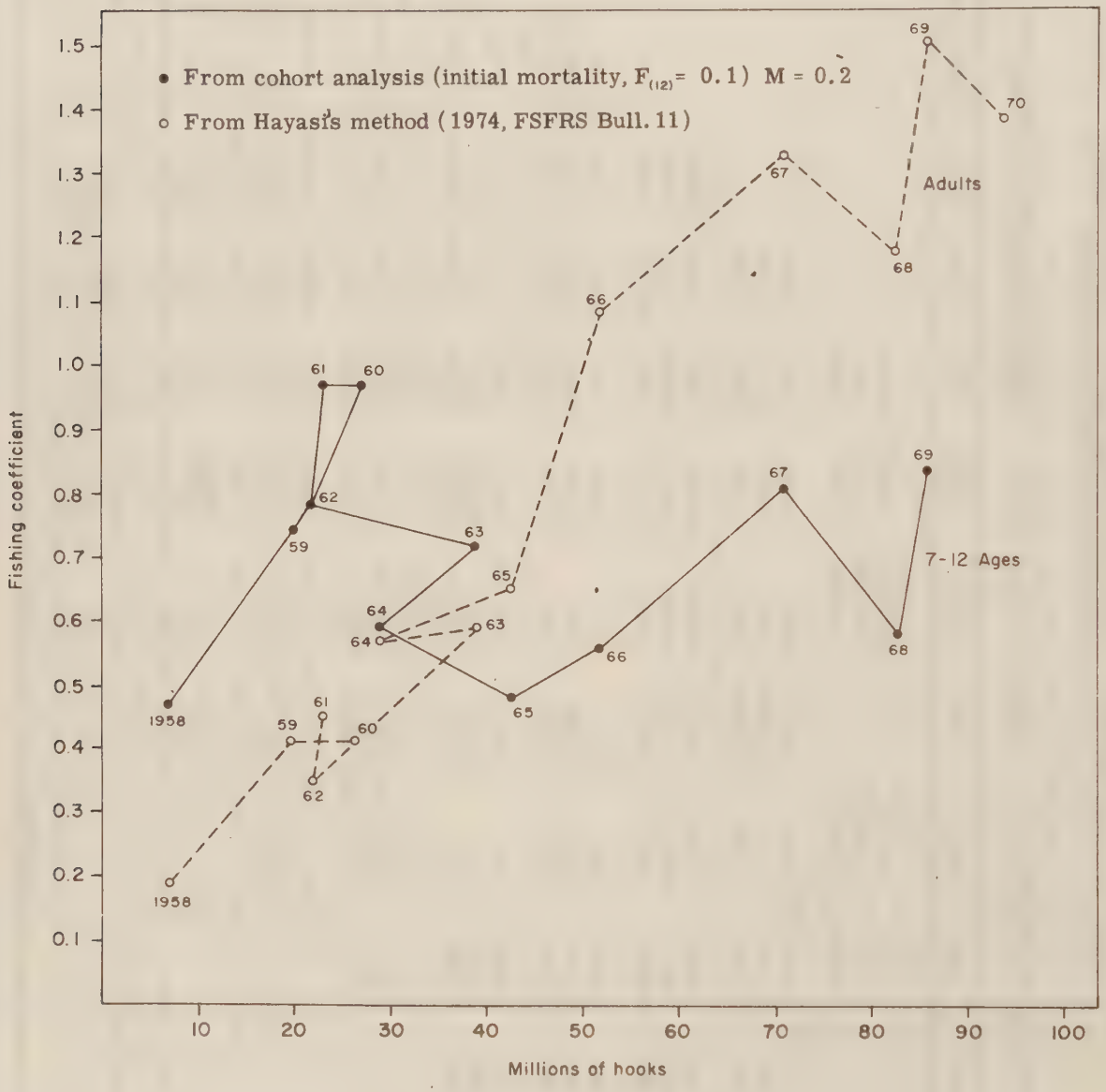
Table 3

Estimates of fishing mortality rates from cohort analysis of combined Japanese and Australian data

From cohorts of fish born 1951–1961 Ages up to 10 M=0.2 Backward interpolation, initial mortalities 0.6, 0.8. 1.0

Age	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
2	0.000007		0.00001	0.00003		0.000008	0.0003	0.0001								
	0.000007		0.00001	0.00003		0.000008	0.0003	0.0001								
	0.000007		0.00001	0.00003		0.000008	0.0003	0.0002								
3	0.00002	0.003	0.004	0.005	0.00002	0.002	0.009	0.018	0.018							
	0.00002	0.003	0.004	0.005	0.00002	0.002	0.009	0.018	0.019							
	0.00002	0.003	0.004	0.005	0.00002	0.002	0.009	0.018	0.019							
4	0.00006	0.025	0.020	0.072	0.007	0.022	0.037	0.082	0.057	0.046						
	0.00006	0.025	0.021	0.075	0.007	0.023	0.037	0.084	0.059	0.047						
	0.00006	0.026	0.021	0.077	0.007	0.023	0.037	0.085	0.059	0.048						
5	0.0003	0.046	0.012	0.11	0.031	0.11	0.056	0.18	0.13	0.064	0.098					
	0.0003	0.047	0.012	0.11	0.032	0.11	0.057	0.19	0.13	0.065	0.100					
	0.0003	0.047	0.012	0.11	0.033	0.11	0.057	0.19	0.13	0.066	0.101					
6		0.093	0.028	0.15	0.29	0.27	0.23	0.30	0.31	0.24	0.15	0.26				
		0.095	0.028	0.15	0.29	0.28	0.24	0.30	0.32	0.25	0.16	0.27				
		0.097	0.028	0.16	0.29	0.29	0.24	0.31	0.32	0.26	0.16	0.27				
7			0.13	0.60	0.43	0.98	0.41	0.88	0.99	0.49	0.16	0.49	0.33			
			0.13	0.61	0.45	0.99	0.44	0.90	1.04	0.50	0.17	0.51	0.34			
			0.13	0.61	0.46	1.00	0.45	0.91	1.07	0.50	0.17	0.52	0.35			
8				0.91	1.16	0.45	0.87	0.60	0.88	0.55	0.78	0.74	0.68	0.74		
				0.95	1.18	0.48	0.90	0.68	0.93	0.60	0.80	0.78	0.72	0.78		
				0.98	1.20	0.51	0.92	0.73	0.97	0.64	0.81	0.82	0.75	0.81		
9					0.98	1.59	0.69	1.31	0.23	0.82	0.42	1.78	0.74	0.77	0.81	
					1.11	1.76	0.80	1.46	0.28	0.93	0.49	1.95	0.85	0.88	0.93	
					1.20	1.87	0.87	1.57	0.31	1.02	0.55	2.07	0.93	0.96	1.01	
10						0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
						0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
						1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

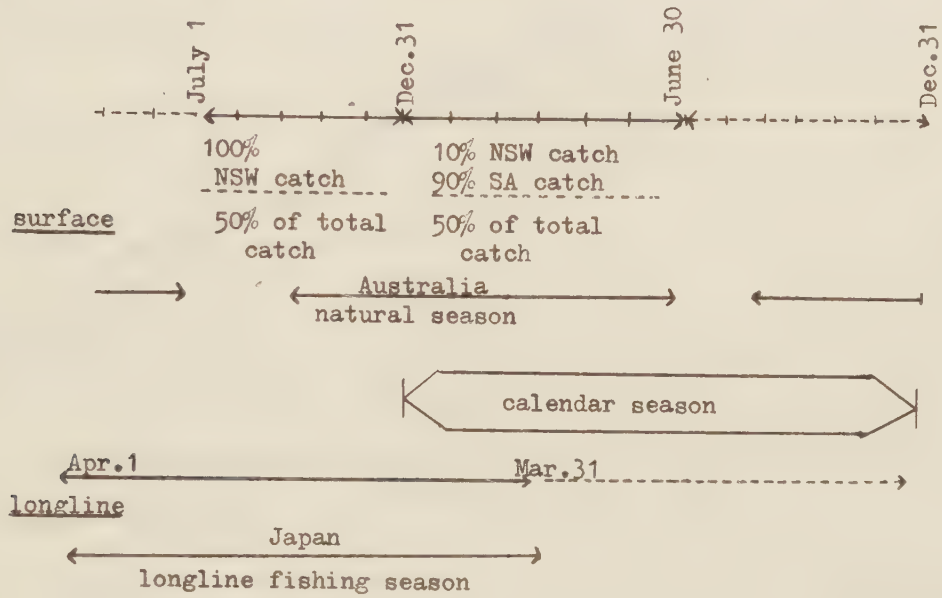
Fig. 3: Relation between fishing coefficient and fishing effort (hooks) of longline fishery estimated from cohort analysis and Hayasi's method (1974), 1958 - 59 to 1970 - 71 seasons.



Japan ..... on fishing year basis

* above longline data are slightly revised
* surface data are taken from Lucas (1974) except for a few years (Western Australia catches are not included but the amounts are small)

It is noted that we should be sure there is no inconsistency in basic numbers and analyze on a common data basis before we reach definite conclusions. Some exchange of information was made concerning the time period to be taken for cohort analysis. The following diagram summarizes it:



The calendar year is preferred for cohort analyses of longline data. When using the calendar year for longline data, the calendar year data for Australia could be used, or the year n-n+1 data shifted forward to the calendar year. The choice might depend on the type of analysis, but in any event should be clearly specified.

If we consider that the Japanese cohort analysis is more nearly correct, then F of the surface fishery was approximately 0.15 in 1963-65 and, judging from the recent increase in the surface catch, the F of recent years would be somewhat increased, probably less than doubled.

It is shown that annual F's of the longline fishery obtained from cohort analysis and calculated as the average of the 7 to 12 ages range between 0.5 and 1.0 (Fig. 3). From 1965 on, F seems to increase gradually. The difference illustrated between Hayasi's result (1964) and the cohort analysis suggests the necessity of examination of catchability coefficient, q.

Other estimates of F

Provisional results of estimation of Z from tagging information were presented (Figs 4-5, Table 4). Total mortality, Z, was 0.6 and if M = 0.2, then F becomes 0.4. It was remarked that tagging analysis should be compatible.

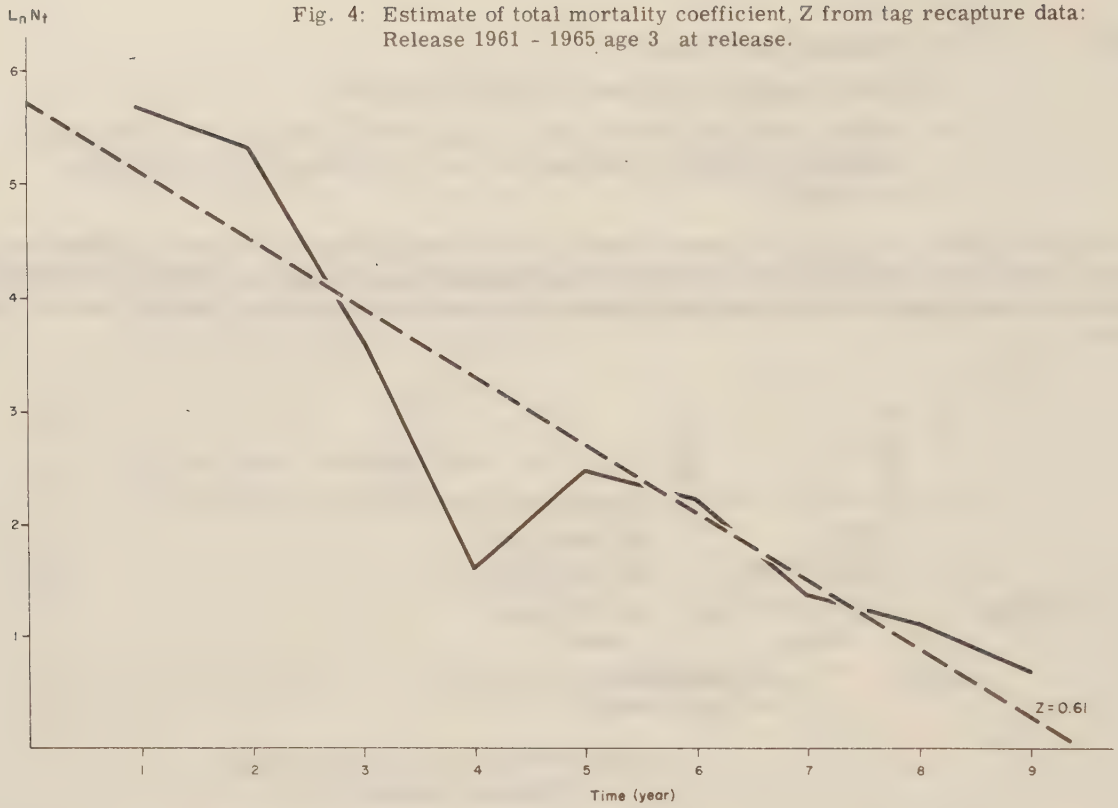


Fig. 4: Estimate of total mortality coefficient, Z from tag recapture data: Release 1961 - 1965 age 3 at release.

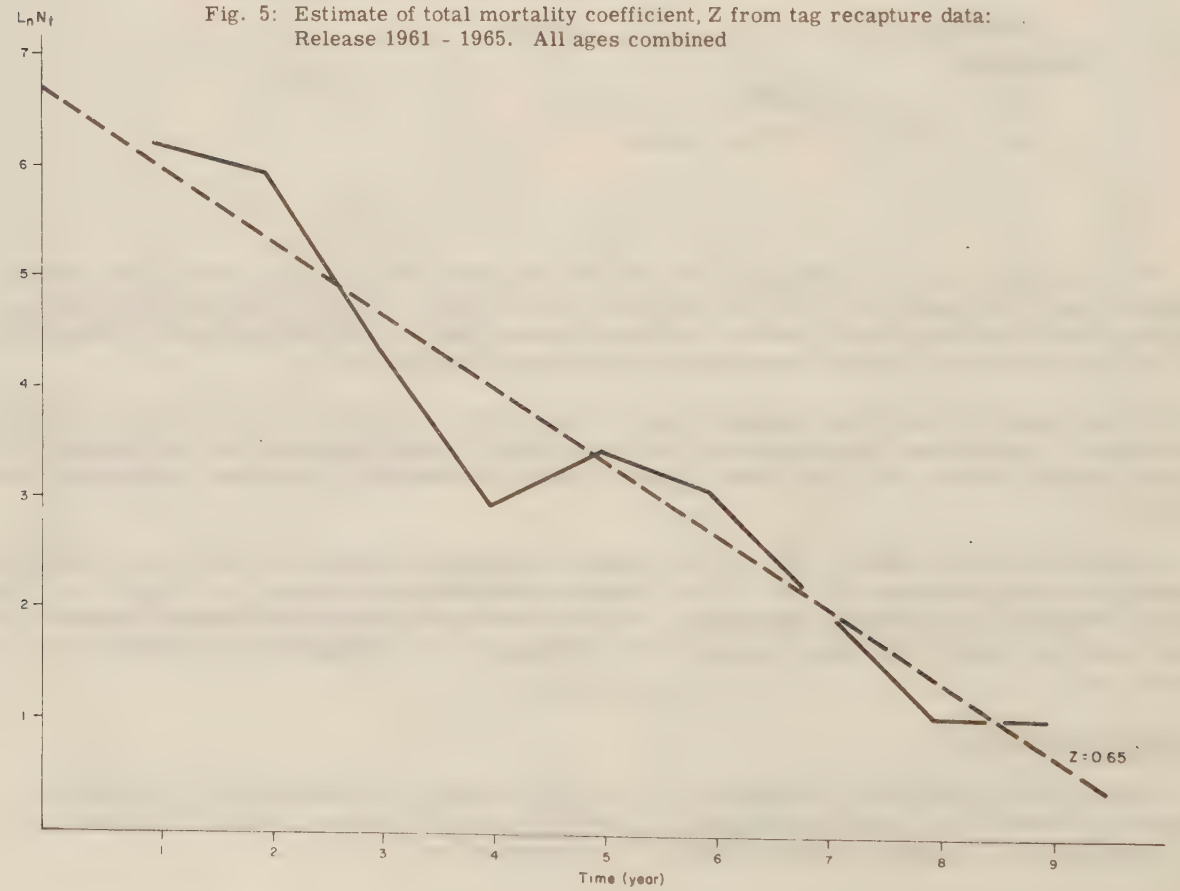


Fig. 5: Estimate of total mortality coefficient, Z from tag recapture data: Release 1961 - 1965. All ages combined

Table 4

South Australian southern bluefin tuna tagging

Period of tagging	Number tagged	Cumulative total	Area where recovered	Number of fish recovered												
				61/62	62/63	63/64	64/65	65/66	66/67	67/68	68/69	69/70	70/71	71/72	72/73	73/74
Feb.-Mar. 1961	18	18	SA	1												
1962	nil	18														
1.1.63-3.12.63	1297	1315	SA		7(3)	5	2									
			LLT			1			1							
			LLI						1							
4.12.63-6.5.64	2292	4307	EA				4	8	5							
			SA			12(6)	70	8								
			LLT				6	9	4	1	1					
			LLS					2	4	2			1	2		
			LLI						2	6	6	7		1		
			LLP						4		2	5		3		
			LLA											1		
1.1.65-30.4.65	504	4811	EA					2								
			SA				4	5	2							
			LLT					1								
			LLI						2							
1.1.66-18.4.66	1071	5882	EA					1	3	1						
			SA					15	22							
			LLT						4	3	2	1				
			LLS						1	1	1		2	2	2	
			LLI						4	1		5			1	1
			LLP							1	3	5		1	1	1
			LLA									1				
19.2.67-26.2.67	20	5902		nil												
14.2.68-30.5.68	502	6404	EA							3	20	4	2	2		
			SA							66(8)	14(1)		3			
			LLT								1					
			LLS							1						
			LLI										1	1		
20.1.69-31.3.69	2387	8791	EA									129(1)	19			
			SA								639	48	7			
			WA								7					
			LLS									1		1	1	
			LLA									1		1	1	
			LLT												2	

Total recoveries 1273

LLT = Japanese longliner Tasman Sea
LLS = Japanese longliner south of Australia
LLI = Japanese longliner Indian Ocean
LLP = Japanese longliner Pacific Ocean
LLA = Japanese longliner Atlantic Ocean
( ) = Re-released included in total

Table 4 (continued)

Western Australian southern bluefin tuna tagging

Period of tagging	Number tagged	Cumulative total	Area where recovered	Number of fish recovered												
				61/62	62/63	63/64	64/65	65/66	66/67	67/68	68/69	69/70	70/71	71/72	72/73	73/74
1.1.61-7.7.62	5218	5218	EA		3	36	1									
			SA	1	15(3)	46(2)	8(1)									
			WA	46(30)	57(25)							1				
			LLT				1	2								
			LLS					3								
			LLI				1					1				
5.6.63-30.6.63	5246	10644	EA		1	15	16	5								
			SA			59(1)	43	5	2							
			WA		82(79)	3										
			LLT					3	3							
			LLS					1	1	3	1				1	
			LLI					1	2		8	1			1	1
			LLP						1	2		2		1		
			LLA											1		
June 1964	4606	15250	EA				17(1)	35(2)	3							
			SA				14	40(14)	9							
			WA			13(11)	7									
			LLT						3							
			LLS								1		1			
			LLI						3	1	5	2				
			LLP								1	1			1	
			LLA									2				
June 1965	1999	17249	EA					15(1)	23	2			2			
			SA					14	15							
			WA				2(2)									
			LLS							1						1
			LLI									7	2			
			LLA									1				
			LLP													1
May-June 1966	634	17883	SA						2							
			LLI											1		
June 1967	5014	22897	EA						7	39(1)						
			SA						70	10(1)						
			WA					81(75)	4							
			LLT									1				
			LLS							3		7		1		
			LLI								1	5		2		
			LLP										1	1		
			LLA									5	1		1	
1968-1969	nil	22897														
Feb.-Mar. 1970	1328	24225	EA											4	1	
			SA											4		
			WA									30				
May 1971	14	24239														
March 1972	136	24375	SA												3	
Jan.-June 1973	262	24637	WA												1	13
														Total recoveries		1032

LLT = Japanese longliner Tasman Sea
LLS = Japanese longliner south of Australia
LLI = Japanese longliner Indian Ocean
LLP = Japanese longliner Pacific Ocean
LLA = Japanese longliner Atlantic Ocean
( ) = Re-released, included in total

Table 4 (continued)

East Australian southern bluefin tuna tagging

Period of tagging	Number tagged	Cumulative total	Area where recovered	Number of fish recovered														
				59/60	60/61	61/62	62/63	63/64	64/65	65/66	66/67	67/68	68/69	69/70	70/71	71/72	72/73	73/74
29.5.59 -31.1.60	137	137	EA	2	6	2												
			SA	1														
			LLT					1										
1.2.60 -28.2.61	132	269	EA				2											
			LLT					1	1									
			LLP							1								
1.3.61 -31.1.62			EA			19	8	3										
			LLT					1										
1.2.62 -28.2.63	472	1019	EA				16	6	1									
			SA				1											
1.3.63 -29.2.64	889	1908	EA					44(2)	7(1)	4								
			SA						2									
			LLT						1									
			LLS							1				1				
			LLP								1					1		
1.3.64 -31.1.65	1062	2970	EA						133(4)	92	11		1					
			SA						6	10								
			LLT								3		1					
			LLP										1		1	1		1
1.2.65 -31.1.66	434	3404	EA							25(1)	5(1)							
			SA							5(1)								
			LLT								1	2	2					
			LLS							1	1							
1.2.66 -31.1.67	2984	6388	EA								75(4)	530	150	8				
			SA								5	3	1					
			LLT									1		3	1			
			LLS										1	1				
			LLI											1				
			LLP											2				
1.2.67 -31.1.68	1818	8206	EA								6(1)	266	285(2)	20				
			SA									27	7	1				
			LLT										4	3	1			
			LLS										1		2			
			LLP											2	1			
			LLI												1			1
1.2.68 -31.1.69	3977	12183	EA										1945(7)	238	8			
			SA										6	6	8			
			LLT										1				1	
			LLS											1	1			
			LLI												2		1	
			LLP												2			
1.2.69 -28.2.70	1551	13734	EA											274	170	12	2	
			SA											6	16	4		
			LLT												2	1	1	
			LLS													2	2	
			LLP												1	1		
1.3.70 -30.6.71	26	13760	EA												4	2		
			SA												1			

LLT = Japanese longliner Tasman Sea
LLP = Japanese longliner Pacific Ocean
LLS = Japanese longliner south of Australia
LLI = Japanese longliner Indian Ocean
( ) = Re-released included in total

Total recoveries 4559

Careful examination of the calculations of F by Lucas (1974) suggested the need for further analysis.

Several comments on the analyses of tagging data were made:

(1) There is a suspicion that fish tagged off the Australian coast do not represent the entire population of the young fish

(2) The low rate of recovery by the longline fishery might be explained by recruits to the longline fishery other than those from Australian coastal waters

(3) Australian tag recovery rates are different among the three areas, and if New South Wales and South Australian groups mix randomly, then we would expect the same recovery rate. There is a possibility that the South Australian group is recruited from fish other than the New South Wales group

(4) Longline F estimated by Hayasi (1974) seems to be too high when considering the number of long-term (9-10 years) tag recoveries

(5) Tag recovery of the first year, within the same season, should be treated cautiously, because of many short-term recaptures, possibly because of intensive fishing in the tagging area

There is general opinion that it is necessary to conduct further analyses of tagging data including patterns of migration, and extensive cohort analysis using more recent surface data and basing on an agreed data series.

ESTIMATION OF RECRUITMENT

Hayasi (1974) estimated the recruits to the longline fishery at 5-age using the following formulae under an assumption that "all the individuals are recruited into longline fishery at beginning of 5-age":

$$R_c = C(F+M) \cdot e^{M(t_c - 5.0)/F}$$

$$R_y = Y/(Y/R)$$

The averages of R_c and R_y in recent years are 130×10^4 and 150×10^4, respectively.

Cohort analysis estimates of recruitment to the longline fishery at age 5 in recent years resulted in values about 120×10^4 as shown in the following table:

Year class	52-53	53-54	54-55	55-56	56-57	57-58	58-59	59-60	60-61	61-62
Number of fish in million	1.7	1.8	1.5	1.2	1.3	1.2	1.2	1.3	1.3	1.2

Recruitment at age 2.5 for the surface fishery was estimated as 3.7×10^6 (Lucas, 1974). Using the recent level of recruitment to the longline fishery 120×10^4 and 0.15 for the fishing mortality coefficient of surface fishery, $N_{2.5}$ was recalculated as 2.88×10^6.

ASSESSMENT OF THE PRESENT STATE OF THE STOCK

The general conclusions concerning the longline fishery analyses are nearly the same as those made in the Nantes Meeting (FAO Fish.Rep., No.152):

(1) Longline effort can be considerably reduced without much decrease in catch (Fig. 1)

(2) The spawning stock has been greatly reduced. The size of fish in the catch is also becoming smaller (Fig. 2)

(3) There is no obvious trend in recruitment to the longline fishery up to and including the 61-62 year class

FURTHER WORK NEEDED

The following items are recommended (the order does not imply priority):

(1) Detailed analysis of tagging records

(2) Analysis of pattern of occurrence of young for a better understanding of population structure

(3) Collection of more length data from the longline catch

(4) Analysis of catchability, q, in order to account for the decreased C/E but fairly steady catch described above

(5) Recompute the parameters of the growth equation

(6) Continued cohort analysis, at least until general agreement is obtained

(7) Refine C/E series of the surface fishery

(8) Examination of the reasons for lack of tag recovery in the spawning grounds

(9) Y/R analysis based on the reliable parameters, when they are available

(10) Examination of the apparent increasing trend to maturity at a younger age, i.e. 6 - 7

(11) Intensify the effort to improve the rate of reporting of tag recoveries from the longline fishery

(12) Assemble all information on small fish in order to assess the size of the fish in their first year of life, i.e. 0+

(13) Examine stock-recruit relationship as soon as more acceptable estimates of both are available

In addition, it is agreed that data exchange will be done smoothly and effectively between Australian and Japanese scientists (Appendix 3). There will also be prompt informal exchange of the results of analytical work.

* * * * * *

Appendix 1

LIST OF PARTICIPANTS

MURPHY, G.I.
Commonwealth Scientific and Industrial
Research Organization (CSIRO)
P.O. Box 21
Cronulla 2230, New South Wales, Australia

YAMANAKA, I.
Far Seas Fisheries Research Laboratory
1000 Orido
Shimizu 424, Japan

UEYANAGI, S.
Far Seas Fisheries Research Laboratory
1000 Orido
Shimizu 424, Japan

YONEMORI, T.
Far Seas Fisheries Research Laboratory
1000 Orido
Shimizu 424, Japan

SHINGU, C.
Far Seas Fisheries Research Laboratory
1000 Orido
Shimizu 424, Japan

HISADA, K.
Far Seas Fisheries Research Laboratory
1000 Orido
Shimizu 424, Japan

WARASHINA, J.
Far Seas Fisheries Research Laboratory
1000 Orido
Shimizu 424, Japan

KUME, S.
Far Seas Fisheries Research Laboratory
1000 Orido
Shimizu 424, Japan

Observers

MIMURA, K.
Fisheries Agency
1-2-1 Kasumigaseki
Chiyoda-ku 100
Tokyo, Japan

KAWAMOTO, S.
Fisheries Agency
1-2-1 Kasumigaseki
Chiyoda-ku 100
Tokyo, Japan

* * * * * *

Appendix 2

AGENDA

June 24 (Tuesday), 13:30 - 17:00

(1) Opening of the meeting

(2) Appointment of Chairman and Rapporteur

(3) Adoption of the agenda

(4) Discussion

a. Recent status of the southern bluefin fisheries

(1) Longline fishery (Japan)

(2) Surface fishery (Australia)

b. Assumed model of life cycle of southern bluefin tuna (especially migration, growth, age and maturation, etc.)

c. Estimation of the fishing mortality, F

(1) Cohort analysis
(i) Based on longline fishery data
(ii) Based on surface fishery data

(2) Comparison between F's estimated from cohort and other analyses

June 25 (Wednesday), 10:00 - 12:00

c. Continued

d. Estimation of recruitments

(1) Recruitment to the surface fishery

(2) Recruitment to the longline fishery

e. Assessment of the present status of the stock

June 26 (Thursday), 10:00 - 12:00

f. Future work and further collection, compilation and exchange of data

13:30 - 17:00

(5) Drafting of the discussion results

June 27 (Friday), 7:30 - 14:00

Excursion (Yaizu Fish Market, processing factories, lunch)

14:00 - 17:00

(5) Continued

(6) Adoption of the report

(7) Closing of the meeting

* * * * *

Appendix 3

MEMORANDUM FOR THE DATA EXCHANGE AGREED UPON AT THE SPECIAL SOUTHERN BLUEFIN WORKING PARTY FOR STUDY

Shimizu, Japan - 27 June 1975

Australia ——————— Japan

(1) Size frequency data for surface fishery

(2) Tag record catalogue

(3) Catch statistics by area and season

(4) Data on very small fish

Japan ——————— Australia

(1) Catch in number and effort in number of hooks by 5 x 5° areas, by month from 1962 onward

(2) Catch in number by length class (2 cm intervals) by major fishing grounds and by quarter from 1952 onward

(3) Future catch and effort statistics by major area and quarter

(4) Provisional estimates for recent catches (items 1-3) will be sent to Australia as soon as available

* * * * *

MR/H5598/E/2.76/1/1100